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Volume I

EXPLANATORY NOTES

for

DEPARTMENT OF AGRICULTURE

Fiscal Year

1953

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## PREFACE

The obligations shown in the project statements are on the basis of the appropriations and activities proposed in the 1953 Budget estimates and reflect in a few instances a revision of the appropriation or project structure to simplify administration of the work involved. Where applicable, the activities reflected in the project statement are further divided into subcategories in order to include detail similar to that previously provided.

It should be noted that it has not been possible, especially in the case of the project statement amounts which are reflected in parentheses for the subcategories, to base the obligations shown in all cases upon data taken directly from accounting records that are formalized by specific account classifications. Wherever, because of the nature of the activity, it has been necessary to distribute certain costs which are not directly available from the accounts, every effort has been made to allocate such charges as accurately as possible based on past experience, periodic time reports, or other factors.



AGRICULTURAL MARKETING ACT (RMA--Title II)

Purpose Statement

184504

Appropriations made pursuant to the Agricultural Marketing Act, formerly referred to as Title II of the Research and Marketing Act of 1946, provide for expansion of marketing research, service, and education activities in which the Department of Agriculture, the State Agricultural Experiment Stations, the Cooperative State Agricultural Extension Services, the State Departments of Agriculture and Bureaus of Markets, and other public and private agencies are cooperating in solving problems relating to the distribution and marketing of agricultural products. Such funds are allotted directly to agencies of the Department for specified projects, or to State agencies on a matching-fund basis for carrying on projects under cooperative agreements, and are used under contract or cooperative agreement with public or private agencies, institutions, organizations, or individuals.

In accordance with Title III of the Research and Marketing Act, the Secretary has established a national advisory committee of eleven members, six of whom represent producers or their organizations, to consult with the Secretary and other appropriate officials of the Department concerning research and service work authorized by the Act, and to assist in obtaining the cooperation of producers, farm organizations, industry groups, and Federal and State agencies. This Title also provides for the establishment, by the Secretary, of appropriate committees including representatives of producers, industry, government, and science, to assist in effectuating specific research and service programs. Committees have been established under this authority to advise the Department on the principal agricultural commodities and in functional or cross-commodity areas such as cold storage, foreign trade policy, and transportation.

This appropriation is administered by the Agricultural Research Administrator.

	<u>Estimated, 1952</u>	<u>Budget Estimate, 1953</u>
Appropriated funds	\$4,972,000	\$5,500,000

AGRICULTURAL MARKETING ACT (RMA--TITLE II)

Proposed Revision of Financial Project Structure

In the formulation of estimates for the first appropriation under the Agricultural Marketing Act and in the execution of the program under appropriations provided by the Congress, it was necessary to divide the work into certain very broad fields. The titles assigned to these fields became the financial projects used in subsequent budgets. It has become apparent, after four years of operation under the Act, that the original financial project structure has a number of disadvantages, among them the following:

1. Classification of a number of existing work projects was difficult because portions of the work related to more than one financial project.
2. The financial project titles were not sufficiently descriptive of the work performed.

In order to provide an appropriate basis for classifying work under this appropriation, a revised structure embodying five financial projects has been developed and is being used in the presentation of the estimates for fiscal year 1953. The following are brief descriptions of the work classified under each of the proposed new financial projects:

1. Marketing costs, margins, and efficiency.--To provide information on costs and relative efficiency which will identify areas where more productive follow-up research work can be conducted, and to provide a basis for constructive educational and service work, studies are made of marketing and merchandising methods and transportation costs, and their effect on production and distribution patterns; alternative methods of performing marketing services; and factors influencing operating efficiency of the different units in the marketing system.
2. Improvement and evaluation of product quality.--To improve quality and acceptability of farm products and to lower marketing costs, studies are made of ways to reduce waste and spoilage, including better storage methods; and new and improved grades and standards are developed for more accurate indication of product quality.
3. Improvements in market organization and facilities.--To develop improvements in market organizations and facilities, studies are made of mechanization, work simplification, market locations and other changes in market organization and their effects.



4. Collection, analysis, and dissemination of market data.--To facilitate orderly marketing of farm products, data are gathered, interpreted, and disseminated on current and prospective production, supplies, movement of goods, prices, and market demand; and studies are made to improve market news and other market information services.
5. Over-all administration.--Approximately 3 percent of the appropriation is expended for over-all administration, planning, and coordination of this program, including the work of the national advisory committee and other special committees made up of representatives of producers, industry, science, and Government.

The following table indicates the relationship, based on 1952 funds (including anticipated supplemental for pay adjustment costs), between the existing financial project structure and the revised structure proposed in the 1953 Budget estimates:

# AGRICULTURAL MARKETING ACT (RMA--TITLE II)

Proposed Revision of Activity Schedules, (Based on amounts appropriated for 1952 including anticipated pay adjustment supplemental pursuant to Public Law 201)

	Present Structure		Proposed Structure			
	Financial Projects		Financial Projects			
	Total Amount	Marketing costs, and efficiency	Improvement and evaluation of product quality	Improvements in organization and facilities	Collection and dissemination of market data	Over-all administration
I Basic data on information on supplies, movements and prices	\$ 566,800	\$ 34,800	--	--	\$ 532,000	--
II Expansion of outlets for farm products .....	744,100	56,100	267,000	32,000	389,000	--
III Measurement and analysis of marketing services, costs and margins .....	649,000	523,700	60,200	65,100	--	--
IV Improvement in the grading, handling, packaging, transportation, storing, and merchandising .....	1,352,800	40,000	544,400	768,400	--	--
V Evaluation and improvement of marketing facilities, methods, policies, and organization and pricing practices .....	1,489,900	218,300	305,000	873,700	92,900	--
VI Over-all administration .....	169,400	--	--	--	--	169,400
Total .....	4,972,000	872,900	1,176,600	1,739,200	1,013,900	169,400

AGRICULTURAL MARKETING ACT (RMA--TITLE II)

Appropriation Act, 1952 .....	\$4,750,000
Anticipated pay adjustment supplemental .....	222,000
Base for 1953 .....	<u>4,972,000</u>
Budget Estimate, 1953 .....	<u>5,500,000</u>
Increase (for additional marketing research, service, and educational work to meet urgent current problems) ...	<u>+528,000</u>

PROJECT STATEMENT

Project	1951	1952 (esti- mated)	Increases	1953 (esti- mated)
1. Marketing costs, margins, and efficiency .....	832,181	\$872,900	+\$10,400	\$883,300
2. Improvement and evaluation of product quality .....	1,508,611	1,176,600	+82,800	1,259,400
3. Improvements in market: organization and facilities .....	1,720,914	1,739,200	+221,500	1,960,700
4. Collection, analysis, and dissemination of market data .....	1,553,274	1,013,900	+213,300	1,227,200
5. Over-all adminis- tration .....	160,908	169,400	- -	169,400
Unobligated balance .....	+156,112	- -	- -	- -
Total pay adjustment costs .....	[- -]	[238,000]	[+38,300]	[276,300]
Total available or estimate .....	<u>5,932,000</u>	<u>4,972,000</u>	<u>+528,000(1)</u>	<u>5,500,000</u>
Reduction pursuant to Sec. 1214 .....	+68,000	- -		
Anticipated pay adjust- ment supplemental .....	- -	-222,000		
Total appropriation or estimate .....	<u>6,000,000</u>	<u>4,750,000</u>		

INCREASE

(1) An increase of \$528,000 for additional marketing research, service, and educational work to meet urgent current problems.

Need for Increase. This increase is required to intensify work to cope with emergency problems in agricultural marketing that are accentuated by mobilization activities with attendant shortages of labor, facilities, and materials required to assemble, process,



store, distribute, and transport the larger farm crops that are being delivered to market.

In order to provide an adequate supply of agricultural products for essential civilian and military uses, and to prevent the cost of such products to the consumer from spiraling, considerable effort is being devoted at present to expanding farm production. It is equally important that every effort possible be made to prevent such costs to consumers from rising as a result of increased marketing costs.

About one-half of the consumer's dollar spent for food products goes to pay for marketing services. Unlike prices paid to farmers, such marketing costs cannot be depended upon to fall when demand recedes. It is, therefore, important that they be prevented from rising. One of the most effective ways to hold down these costs is to increase the productivity of labor employed in marketing. Greater labor productivity can be attained through increased mechanization, through more efficient utilization of existing equipment and facilities, and through more intelligent management of stocks and supplies of farm products. Traders, handlers, and distributors are anxious to obtain greater productivity, but they need the results of scientific research brought to them through educational and service programs to get new and improved methods and practices adopted quickly.

Work under the Agricultural Marketing Act has been redirected to attack current problems arising from the mobilization program. While funds for this program have been reduced, the need for the work has been accentuated as evidenced by the fact that marketing margins for agricultural products have been rising faster than prices received by farmers. This is in contrast with the usual development in a rising price period because prices of raw materials, including farm product prices, normally rise faster than other costs. During the past year, the margins reached the highest dollar levels ever established.

Requests for Additional Work by Agricultural Research Policy Committee.

These developments were foreseen by the Agricultural Research Policy Committee, which after carefully reviewing the marketing program and the prospective situation, adopted the following conclusions and transmitted them to the Secretary:

"CONCLUSIONS OF THE AGRICULTURAL RESEARCH POLICY COMMITTEE  
ON THE NEED FOR IMMEDIATE EXPANSION OF MARKETING RESEARCH  
AND SERVICE ADOPTED FOLLOWING DISCUSSION AT REGULAR MEETING,  
APRIL 26, 1951

"The need for marketing improvements and adjustments is vital in the current mobilization program in which shortages of food and fiber, manpower, transportation, equipment, and facilities make greater marketing efficiency an absolute necessity. Therefore, the Agricultural Research Policy Committee feels impelled to call attention to the extreme urgency for additional marketing research and service work. Larger appropriations for this work are needed now.

"Even though the importance of increasing farm production is widely recognized, it is equally essential to the defense effort to decrease the waste and inefficiencies in distributive channels. We are still losing large quantities of farm products between the producer and the consumer, which losses for some products exceed 20 per cent.

"Statistical reports and market news providing reliable information on market supplies, movements, stocks, disappearance and prices of commodities are essential to both buyers and sellers and to regulatory agencies concerned with emergency controls if they are to operate intelligently and efficiently.

"Manpower shortages make it imperative that the marketing job be done with less labor. Rapid turnover of personnel requires that the work be done with less experienced help. Consequently, work simplification research and training programs must be expanded. Critical material shortages require the development of substitute packages and methods to protect the quality of farm products until they reach consumers.

"Rising distributive margins which are greater now than ever before must be checked. This can be done most effectively with lower cost operations developed through research or adopted with the assistance of education and service programs.

"The factual basis for improving farm product distribution requires continuity of effort by a competent staff. While farm surpluses are not a problem today, they are inevitable at the end of the present emergency. Research can make little contribution unless it begins now. The Nation cannot afford to wait until surpluses are upon us again as we did in 1946 and 1947.

"With the help of the commodity and functional advisory committees which have reviewed the marketing research program, the only way we see to do the most effective marketing job is through increased appropriations for marketing research and service.

"The Agricultural Research Policy Committee established by the Research and Marketing Act 'to make recommendations relative to research and service work authorized by the Act' transmits this recommendation to the Secretary of Agriculture with the request that the urgency of immediate action on this situation be brought to the attention of all Government officials responsible for budgets and appropriations."

Subsequent events have borne out the Committee's judgment and emphasized the need for increased support for marketing research and service. Research and service activities designed to attain greater marketing efficiency constitute a positive program accompanying the campaign for greater farm production to combat rising living costs. The work done thus far has shown how food losses can be reduced with less insect damage, bacterial contamination and rough handling, so that more products of higher quality can reach the ultimate .



consumers; how better use of equipment and training of labor can get greater output from available resources; and how less critical materials can be employed and greater use can be made of existing transportation, storage, and handling facilities.

Adjustments to Meet the Current Emergency. Pursuant to directives of the Congress and the President, the Department undertakes to tackle emergency problems as they arise in the mobilization period. This is done by redirecting work being conducted under going projects, by curtailing projects dealing with less urgent matters, such as those intended to expand market outlets for farm products, and by giving greater emphasis to work intended to conserve products in the marketing system and resources used to perform marketing services. These adjustments do not, however, provide sufficient funds for properly carrying out all work necessary to meet urgent current problems.

The major items of additional work that would be provided with the proposed increase under each financial project are indicated in the following discussion.

Project 1. Marketing Costs, Margins, and Efficiency (Increase of \$10,400). Costs of some marketing services, such as transportation and storage, have risen because rates have gone up without any comparable advance in quality or quantity of services performed. This has increased the demand for factual information to be presented at rate hearings where the service charges and rates are established. An expansion of this work is proposed.

New work should be initiated on the storage of grain. This is considered important in the light of possible emergencies in the current defense period. Information on relocating food stocks to minimize the risks and on the relative costs of holding stockpiles at different locations is particularly needed.

Project 2. Improvement and Evaluation of Product Quality (Increase of \$82,800). One of the most tangible approaches to increasing marketing efficiency is to devise ways and means to better maintain the quality of farm products as they pass through the marketing channels. At least three distinct advantages result from successful work of this type: (1) It helps to eliminate waste from spoilage, which constitutes one of the major cost items in wholesale and retail distribution of fresh farm produce; (2) it contributes to greater satisfaction of consumers who feel that they have a right to expect top quality merchandise at the prices they are paying; and (3) it results in better nutrition and improved diets of consumers who ultimately receive the products.

A current problem requiring additional work in this field is how to provide materials which will give reasonable quality protection or find substitutes for such materials. Critical material shortages are affecting sprays, fumigants, wrappings and container supplies so alternatives have to be developed. Research is necessary to find out what alternatives are practical. Similarly, mobilization demands call for products with different specifications than are ordinarily required and research is proposed to help ferret out and expand supplies of products having the qualifications that are sought. Stockpiling programs for non-perishable farm products are intensifying some of the storage protection problems to the point where precautions ordinarily taken are not satisfactory, so further work is proposed to show what can be done to meet the most adverse conditions anticipated.

A vast amount of educational and technical assistance has to be provided to carry the information already developed to market operators and their employees who are entrusted with the products between the farm and the retail store. In view of present scarcities and high prices for many farm products it is particularly urgent that methods for achieving maximum protection of products be adopted quickly not only to avoid monetary losses but to better supply essential food requirements.

Project 3. Improvements in Market Organizations and Facilities (Increase of \$221,500). An explanation for some large cost increases for marketing services is found in the fact that old established market sites, structures and facilities cannot efficiently handle the types, volumes and variety of products that now have to be distributed. Yet the antiquated methods and facilities continue to be employed. With the continuing shift to motor transport for the great bulk of farm produce, with the building of new high speed arterial highways and with the further growth of urban centers, market facilities have to be relocated, expanded and adapted for different kinds of equipment. Unless the research and services to help plan and execute the changes are forthcoming the improvements will lag. Experience has shown that marketing firms acting individually are incapable of tackling the problems. Expansion of this work would provide a public service that would benefit producers, dealers, and consumers alike, and it should be stepped up rapidly to take advantage of the technological advances now available.



The phenomenal growth of the frozen food industry has introduced a whole range of problems pressing for attention. Many questions have to be answered regarding what facilities are needed, where they should be located, and how the distribution system should be altered to handle the products. In response to urgent requests from the industry for guidance before heavy investments are made in unsuitable or inefficient plants, warehouses, trucks, and display equipment, expanded research is proposed to help find the answers.

Increased mechanization and work simplification methods should be developed to cope with labor shortages and rising wages at virtually every stage of marketing. The needs are especially important at wholesale and retail levels where marketing margins are the widest and where current costs are going up very rapidly. Expanded work to alleviate these problems would include research, training and educational projects intended to help the small operators, who still distribute the bulk of the farm products and who have the least opportunity to be familiar with the improvements available to them.

Research has shown that much greater efficiency can be achieved if handlers and their employees know how to make maximum use of equipment they now own. In view of the limitations now affecting construction and manufacturing, the technical assistance currently being provided to help operators achieve lower cost operation without additional investments in new structures or equipment should be expanded.

In a number of instances the achievements of scientists in developing new and improved varieties of crops have been dissipated because the seeds were lost in the marketing system before they could be protected and be reproduced in sufficient quantity to meet the demand for them. Experimental work on the marketing of forage grass seeds, where the problem is especially acute, has demonstrated how changes in the marketing organization to facilitate cooperative efforts of breeders, producers and the seed trade can correct this situation. Because the demand for more animal feeds is now so great and promises to become more critical in the immediate future, it is planned to enlarge this work.

Expansion of production of farm products requires that marketing facilities be available to handle the products. Meat animal production in areas where such production is a sideline or a byproduct of other specialized types of farming illustrates this situation. To encourage greater production in these areas new studies should be initiated to help perfect the marketing arrangements. An expected result of such research would be to obtain more efficient utilization of the specialized types of products that tend to be sold under such circumstances.

Project 4. Collection, Analysis and Dissemination of Market Data (Increase of \$213,300). Under the rapidly changing conditions of production, demand, and prices for particular products that characterize the present situation,



market information and data become more important than usual to prevent the spread of non-productive speculation and costly uncertainty among traders. When crop production increases quickly, for example, dealers, processors, storagemen, and government agencies have to handle their stocks in such a way as to keep industrial disruptions at a minimum and to cushion the price changes. Receivers, shippers, processors and handlers have to arrange to pack, transport, store, package and distribute the products when they are sent to market. Plans for handling and disposing of the anticipated supplies have to extend beyond the domestic markets and into foreign markets that are dependent upon American agriculture for their needs. The work of gathering the data basic to the formulation of plans to meet rapidly changing market conditions should be expanded.

Efforts to conserve products that are particularly short are aided by additional market news and statistics. These help farmers to decide where and when to sell and help buyers to know where, how much and what qualities of the products will be available. Consumers also need to be kept informed about prospects of supplies, and ways of adjusting to changes in kinds and quantities of products available to them so they can purchase and use the products economically. Expansion of this work is required especially for those products that are expected to be subject to the most radical changes in demand or supply.

There is a continued demand on the part of industry for market and consumer acceptance studies. Such studies insure that processors and distributors will convert agricultural raw materials into the forms of products most desired by customers in different areas. Special efforts are being made by industry to make the best use of short supplies by eliminating or reducing the output of products that can be dispensed with, and to adjust the price relationships between farm products for different purposes so that they will more accurately reflect current relative demands for and the actual uses made of the farm products. Additional research to aid industry in finding the answers to these problems should be initiated.



## STATUS OF PROGRAM

The Agricultural Marketing Act, formerly referred to as Title II of the Research and Marketing Act, provides for research and marketing services in which the Department of Agriculture, the State Agricultural Experiment Stations, the Cooperative Agricultural Extension Service, the State Departments of Agriculture and Bureaus of Markets, and other public and private agencies cooperate in solving agricultural marketing problems.

The Act provides for continuous research to improve the marketing, handling, storage, processing, transportation, and distribution of agricultural products, and facilitates cooperation among Federal and State agencies, producers, industry organizations and others in the development and effectuation of research and marketing programs to improve the distribution processes. It contains authorization to work on virtually all phases of marketing, using contractual, matching fund and cooperative arrangements with public and private agencies. Among the numerous projects conducted under the program, advantage is taken of each of these authorized arrangements to conduct relevant research, service and educational activities.

The program is also designed to benefit all of the major agricultural commodity groups and as many of the minor commodities as possible, and to provide significant work at each stage of marketing, such as in assembly points, terminal or central markets, wholesale and retail markets. The essential objective of all the work is to increase the efficiency with which agricultural products are taken in the raw state from the farm and placed in the hands of consumers in the forms, at the times, and in the places desired by consumers.

### Advisory Committees:

Agricultural Research Policy Committee. Adjustment of the marketing research, service and education programs to the needs of defense received the major attention of the Agricultural Research Policy Committee at its quarterly meetings. The Committee emphasized the need for continuing basic research and for concentrating on problems that would lead to increased production, to more effective utilization of materials, facilities and manpower in processing and marketing and to the elimination of waste. Special attention was given to the problem of more rapid and effective dissemination of the results of research to those who could apply them.

Commodity and Functional Advisory Committees. During 1951 all of the commodity and functional advisory committees held at least one meeting. They reviewed the programs underway in their respective areas and appraised them in view of defense needs and needs of the mobilization program. Many committees revised considerably their previous recommendations in light of the current national emergency, and commended the Department for adjustments already made or in progress.



In 1951 the activities of the committees were broadened to include, in addition to programs authorized by the Research and Marketing Act, all other research of the Department in the areas of work for which committees have been established.

Excellent attendance of members at meetings and active interest both during and between meetings have enhanced the value of the advisory committees.

Research and Service Contracts. Authority to contract with agencies outside of the Department for research and marketing services provides a means whereby the resources of private and other public research and marketing service organizations may be brought to bear on the agricultural problems which require additional knowledge for their solution. As provided in the Act, research and service contracts are used where the work can be carried out more effectively, more rapidly, or at less cost than if performed by the Department. All contract work is supplemental to and coordinated with research and service work conducted by the Department. In the fiscal year 1951, 36 such contracts and 16 amendments were executed under Title II totaling \$766,985.

Further data on these contracts, including the project under which the contract was let, contractor, contract objective and amount are shown at the end of the statement which follows on Selected Examples of Recent Progress.

#### Selected Examples of Recent Progress

1. Additional Progress Made in Foundation Legume Seed Program. The number of varieties included in the program has been increased from three to twelve. Prior to the initiation of the Foundation Seed Project, only about one-thirtieth of the seed needed of Ranger and Buffalo alfalfa was being produced ten years after these varieties were released. This, however, was better than for most other varieties the plant breeders had developed. More certified seed of Ranger alfalfa was on the market for 1951 planting than has ever been available for any other improved alfalfa variety. Three hundred percent more certified Buffalo alfalfa seed was available for 1951 planting than was available in 1950. Beginning with the 1951 crop, certified seed of Kenland red clover was available in large volume for the first time through the regular seed distribution system. The supplies of stock seed have been built up to sustain a certified Kenland seed production of at least 10,000,000 pounds, which is 100 times the quantity available in 1950. The Foundation Seed development is particularly timely in view of the present emphasis on increased forage and pasture production.
2. Methods for Handling and Shipping Potatoes Improved. In a transportation test in severe winter weather it was found that two heaters per car were not sufficient to prevent freezing when potatoes were about 39° F. at loading. There was less danger when the potatoes were 45° F. when loaded. The test suggests that three heaters per car should be used when the outside temperatures are lower than minus 10° F.

When loading potatoes in extremely cold weather, a canvas tunnel, with an adjustable frame to make a tight connection between the warehouse and car door, was developed and tested to provide adequate protection against freezing injury. Its use will make possible more orderly shipments regardless of the weather and will aid in the more efficient utilization of refrigerator cars.

A physiological disease of potatoes that causes black spots to develop in the flesh, usually in bruised areas, is most severe in potatoes shipped from storage during the winter months. Tests have indicated that this disease can be minimized by exposing the tubers to 60 or 70° F. temperature for two days before they are removed from the storage bins and graded.

Two improvements have been made in equipment for handling potatoes out of storage that reduce bruising losses. A flexible rubber hammock transfer hopper has been developed for use when transferring potatoes from one elevating apron to another. A hydraulic bag filling stand has been developed for supporting 100-pound bags and gradually lowering the bags as they are filled with graded potatoes delivered from the end of the inspection table.

3. Marked reduction in rejected milk at Mississippi evaporating plants is the result of a marketing service program conducted by the State Department of Agriculture. This work is greatly decreasing the former annual loss in Mississippi of approximately 2,000,000 pounds of milk due to poor quality. At one plant 15,697 pounds of milk was rejected in the year before the program started. This was reduced to 3,764 pounds by periodic checks of milk at the same plant.
4. A program with cheeseplants in Wisconsin has in three years increased from 23 to 50 percent the percentage of cheese produced which meets the standards for the top grade.
5. Elevator storage capacity for corn and other grain has been increased by almost a million bushels and drying facility capacity by 2,050 bushels per hour in North Carolina. This resulted from a survey and work with the groups concerned with the improvement of the quality and supply of grain grown and consumed within the State.
6. Thermostabilization of eggs (heat treating to preserve quality) has been found effective. Eggs thermostabilized at 134° F. for 16 minutes and stored for 7.5 months in a commercial warehouse showed an 85 percent retention of U.S. Grade A quality as compared with 37.8 percent for eggs which were oil treated and stored under the same conditions.



7. Packing-shed services, cold storage, and selling at shipping-point accounted for 30 percent of the consumer's dollar spent for fresh Eastern apples of all varieties sold in Pittsburgh. Packing-shed services, including charge for the container, accounted for 22 percent; and shipping-point expenses, including cold-storage, for 8 percent. The total charges for these services ranged from \$0.93 to \$1.59 per bushel when apples are packed in northwestern-type boxes, and from \$0.84 to \$1.33 when packed in bushel baskets. Data collected from canners indicate that costs of the raw product made up from 28 to 34 percent of the sales value, f.o.b. cannery, of 5 principal canned fruits and vegetables. Costs of cans and other supplies varied from 24 percent for tomatoes to 34 percent for cling peaches. The labor required for canning, depending on the extent of use of machinery, varied from 7 percent for peas to 16 percent for pears.
8. Color photographs illustrating the minimum requirements of various grades of beef have proved of inestimable value in facilitating interpretation of the standards for the established grades. The industry has expressed approval of the use of these photographs for reflecting minute differences in grades, and has made numerous requests for the illustrated grading manual. Preliminary color pictures indicate the similar usefulness of photographs as aids to illustrating carcass grade differences in veal, lamb and mutton.
9. There was an average audience of 50,000 for the 58 consumer education programs broadcast on television by the local extension office in Minneapolis. Requests were received from 6,000 persons for recipes and additional information on "good buys" as a result of these programs.
10. In Wisconsin technical aid was given to 290 dairy plants through the extension dairy marketing project. Increased operational efficiency was achieved by supplying information on plant layout, improving quality and packaging and eliminating waste. It was estimated that the consolidation of two dairy plant operations resulted in an annual saving in operating costs of approximately \$50,000.
11. Measuring Bread-baking Quality of Wheat. The sedimentation test (a process resulting in the swelling and settling of gluten particles in solution) is found to be a valuable index of the potential bread-baking quality of hard wheats produced in the mid-west. Tests also indicate that the method is equally applicable to the wheats produced in the Pacific Northwest.
12. The U. S. standards on rough rice, brown rice and milled rice were completely revised to make them more useful to rice growers, millers and other branches of the industry. The standards were revised to reflect the quantity and quality of milled rice that can be obtained from a given lot of rough and brown rice. These

revisions were possible because of the perfection of special rice grading equipment during the past year which includes a Sheller and Miller and the adaptation of a Dockage Tester for cleaning rough rice.

13. Reducing Insect Contamination in Processed Vegetables and Fruits. Preliminary work has shown that eggs of the asparagus beetle can be removed by immersing the freshly harvested asparagus tips in certain dips or washes prior to processing, without apparent damage to the asparagus. Tests indicate that vinegar gnat contamination of processed fruits can be reduced materially by burying culled tomatoes and peaches. These culls serve as a source of the insects. The infestation can also be controlled by spreading such culls in a thin layer on the soil surface to dry them.
14. New Treatment Kills Citrus Blackfly on Limes. Dipping packed limes with emulsions of wool-processing oils has given complete mortality of a blackfly population consisting of over a hundred thousand individuals without causing injury to the fruit surface or a change in flavor, and without leaving boxes or packing oily.
15. Development of Bagging Chute Reduces Cost of Prepackaging Apples. During the course of research conducted to reduce the cost of prepackaging apples, a bagging chute was developed that has been covered by a public patent and is now being manufactured in commercial quantities. This bagging unit can also be used for prepackaging other commodities in various types and sizes of bags and either as a single portable bagging unit or in a battery on a separate bagging line for maximum efficiency. Detailed plans and specifications are available for distribution.
16. Equipment has been developed for the effective drying and cleaning of cottonseed in connection with the ginning process. Data developed establish safe limits of drying temperatures, period of exposure during the drying process, air volumes and period of cooling required for effective removal of excess moisture from damp seed cotton and for the preservation of the viability and milling value of the seed. The net increase in the aggregate annual value of the cottonseed crop that could be attained by the drying of that portion of the crop having a moisture content too high for safe storage is estimated at approximately \$15,000,000.
17. New Markets to Pay for Themselves in 3 to 6 Years. The replacement of antiquated produce market facilities in Columbia, S. C., San Antonio, Texas, and St. Louis, Mo., with new facilities of modern design should not only improve marketing conditions in the areas served, but should also stimulate comparable action in other localities. Studies in these three cities completed during the year indicate that the savings in marketing costs which may be expected through operations in the kinds of



facilities now under construction will amortize costs of constructing these facilities in from three to six years.

18. Handling Costs Reduced by Better Use of Present Equipment. Studies on physical handling of packages of farm and food products at various stages of the marketing system are pointing the way, through the adoption of improved methods of using the present equipment, to possible savings in labor of up to 80 percent of that normally used. However, savings of approximately 35 to 40 percent are more nearly the average of what might be expected for the normal operation.
19. New Method of Loading Cantaloupes Reduces Losses. By loading cantaloupe crates on the end instead of on their side it has been found that the amount of crate breakage was reduced one-third, bruising was reduced 50 percent and 24 more crates could be loaded in each refrigerator car with a consequent reduction in per crate refrigeration charge that could amount to \$275,000 per year. If all melons were loaded on end the saving in container damage could amount to \$600,000 per year.
20. Tests conducted on the transportation of frozen citrus concentrate have resulted in recommendations to manufacturers of refrigeration units for design modifications to facilitate proper distribution of refrigerated air. It has been demonstrated that minor changes in trailer bodies and load arrangements made at a nominal cost will improve air circulation.
21. Potential improvement of 60 to 85 percent in manpower productivity in receiving, price marking and stocking of grocery items in self-service food stores has been demonstrated. The improvement over typical operations can be achieved by maximum use of roller conveyors, improved layout of "backroom" and use of a 2 or 3 man unloading crew.
22. Suitable Storage Temperatures Determined for Grapefruit. Storage tests on Rio Grande Valley grown Marsh Seedless grapefruit showed that 52° F. was a better temperature for long storage than 31° or 38° F. These lower temperatures caused excessive pitting and browning of the skin. In two seasons' work, total decay after 14 and 15 weeks storage at 52° F. did not exceed 4.5 percent in fruit stored before packing and about 6 percent in fruit stored after it was packed.
23. Elevator charges for grain storage are generally less than farm storage costs in the southwest cash wheat region. Farmers can afford to use elevator storage when it is conveniently available because of the cost of moving grain in and out of the farm granaries. Cooperative and other elevators in this area, therefore, can safely construct storage capacity for anticipated long-time requirements.



24. Cost of Producing Butter by Small and Large Iowa Creameries. The cost of manufacturing a pound of bulk butter varied from approximately 8 cents in a plant producing slightly less than 200,000 pounds annually, to 2.5 cents in plants producing close to three million pounds annually. The Iowa Agricultural Experiment Station found that in plants using 2 or 3 churns, the manufacturing cost decreased at a rather constant rate from approximately 4.5 cents in plants producing about 500,000 pounds annually, to 2.5 cents for the larger plants. However, a well-organized one-churn plant producing about 750,000 pounds annually was producing butter at a cost of only 0.7 cents per pound higher than the most efficient large plant. This study brings out some of the opportunities for market economy through properly relating equipment and labor to volume of production.
25. A large potential foreign demand for United States tobacco is indicated by first hand studies in Europe and elsewhere. However, effective demand is being limited by a number of factors. These include continued restrictions placed on trade by many foreign governments, shortage of dollar exchange, intensified efforts in many countries to obtain increased supplies from soft currency areas, and the promotion of domestic production in several important importing countries. In addition to the assembling and frequent reporting of information relating to the various problems influencing the exports of U. S. tobacco on a country to country basis, special developments unfavorable to the exports of U. S. tobacco have been investigated in Europe and courses of action to counteract such developments have been recommended. Many United States trade groups and individuals as well as government agencies have been assisted in their programs to promote the exports of United States tobacco.
26. Production and Stocks Reports for Vegetable Seeds. These reports assist in maintaining a balance between supplies and demand for vegetable seeds so that current and future supplies may be adequate for domestic and export demand. Information has been provided regarding current and prospective acreage, production, stocks, and consumption of 46 kinds of vegetable seeds and more than 200 varieties and types.
27. Survey of Potato Storage Supplies. These special reports of holdings provided Government officials charged with administering the price support program with a basis for estimating the quantity of potatoes bought in the respective areas. With the continued upward trend in yields and declining per capita consumption of potatoes, increasing difficulties are encountered in marketing this crop. The reports showing grower and dealer holdings on February 1 and March 1 provide growers and others interested in marketing this crop with an appraisal of the stocks situation on these dates.

28. Bruise-Free Grapefruit Sell Better. The Texas Agricultural Experiment Station found that by careful handling of grapefruit during harvesting operations the percentage of bruised fruits entering the packing shed was cut down from an average of 51 percent to 24 percent. Fruit in paperboard containers as contrasted to fruit in wirebound boxes showed 45 percent and 78 percent bruising respectively upon market arrival. A store test to determine consumer reaction to external fruit quality in grapefruit indicated that high quality outsold the average quality fruit in a ratio of 3 to 2.

UNITED STATES DEPARTMENT OF AGRICULTURE  
RESEARCH AND MARKETING ACT OF 1946

Research and Service Contracts,  
Fiscal Year 1951 (Title II)

<u>Proj.</u> <u>No.</u>	<u>Project Title and Objective of Contract</u>	<u>Contractor</u>	<u>Amount</u>
33	Price, demand, supply and consumption analysis for farm products. (BAE)		
	<u>Objective of Contract:</u> Develop mathematical model which combines statistical demand analyses with data showing physical movement of goods and services between farm and nonfarm industries.	Princeton University, Princeton, N. J.	\$2,100
44	Prepackaging of perishable horticultural products. (PMA) (FCA)		
	<u>Objective of Contract:</u> Develop more efficient methods of prepackaging fresh cherries at shipping points.	Washington State Fruit Commission, Yakima, Wash.	7,000
	<u>Objective of Contract:</u> Obtain preliminary data on cost of prepackaging fresh topped carrots at shipping points.	Hermes Associates, Santa Clara, Calif.	11,000
	<u>Objective of Contract:</u> Record data on costs of packaging potatoes in the 1950-51 season.	Pennsylvania Cooperative Potato Growers, Inc., Allentown, Pa.	443
		Maine Potato Growers Exchange, Presque Isle, Maine	350
		Michigan Potato Growers Exchange, Cadillac, Mich.	150
55	Improving the effectiveness of wholesale market news services. (PMA)		
	<u>Objective of Contract:</u> Improve the effectiveness of wholesale market news by testing methods of reporting for livestock and poultry feeds in deficit feed-producing areas on a localized basis.	University of Arkansas, Fayetteville, Ark.	10,500



Proj. No.	Project Title and Objective of Contract	Contractor	Amount
70	Improving market outlets for various kinds of cotton in relation to merchandising procedures. (PMA)		
	<u>Objective of Contract:</u> Spinning and weaving tests to indicate manufacturing waste, processing performance, and product quality of cottons for specified uses.	School of Textiles, Clemson Agricultural College, Clemson, S. C.	15,000
75	Developing, demonstrating and promoting more efficient market facilities, organization and equipment for handling farm products at concentration points, terminal and secondary markets. (PMA)		
	<u>Objective of Contract:</u> Compare efficiency of various types of apple handling machinery determine amount of equipment needed; and develop improved methods of using various types of equipment.	Washington State Apple Advertising Commission, Yakima, Wash.	22,000
	<u>Objective of Contract:</u> Improve efficiency of operations and grading or sorting of farm and food products by visual means.	University of California, Berkeley, Calif.	11,200
	<u>Objective of Contract:</u> Compare efficiency and determine amount of materials-handling equipment needed by public refrigerated warehouses; develop improved methods and layouts.	Trundle Engineering Company, Cleveland, Ohio	52,200
76	Evaluation of alternative methods and development of procedures for increasing efficiency of marketing eggs and maintaining quality. (PMA)		
	<u>Objective of Contract:</u> Measure and evaluate egg quality changes under refrigerated and nonrefrigerated conditions in marketing channel from farm to consumer; and study results of marketing of high-quality eggs.	State College of Washington, Pullman, Wash.	8,000
83	Processing of meat products in frozen food locker and related plants. (FCA)		

Proj. No.	Project Title and Objective of Contract	Contractor	Amount
83	Continued	Macoupin Locker Service, Inc., Carlinville, Ill.	1,080
<u>Objective of Contract:</u> Provide cost information on storage, merchandising, and processing of meat products in frozen-food locker and related plants, and establish effect of fluctuating volume on rates and margins.			
84	Merchandising products processed by horticultural cooperative associations. (FCA)	North Pacific Canners and Packers, Inc. Portland, Oreg.	226
<u>Objective of Contract:</u> Obtain sales data from cooperatives on fruits and vegetables.			
85	Development of new and revised standards for grades of processed fruits and vegetables. (PMA)	California Agricultural Experiment Station, Berkeley, Calif.	10,000
<u>Objective of Contract:</u> Develop evaluation methods for tenderness and maturity of frozen lima beans; improve U. S. standards for the product.			
106	Improving distribution methods and practices in the handling of foods. (PMA)	United Fresh Fruit and Vegetable Association, Washington, D. C.	20,000
<u>Objective of Contract:</u> Improve the distribution methods for fresh fruit and vegetables through experimental training of retailers and their employees in methods of preparing, caring for, displaying, and merchandising such products.			
<u>Objective of Contract:</u> Improve poultry and egg-distribution methods by experimental training of retailers and their employees.		Poultry and Egg National Board, Chicago, Ill.	40,000
<u>Objective of Contract:</u> Appraise effectiveness of experimental training classes in poultry and egg merchandising by determining extent of reduction in waste, improvement in quality, and increased sales that result.		University of Missouri, Columbia, Mo.	2,500

<u>Proj. No.</u>	<u>Project Title and Objective of Contract</u>	<u>Contractor</u>	<u>Amount</u>
126	Introduction of meat-type hogs and improved swine carcasses for commercial distribution. (FCA)		
	<u>Objective of Contract:</u> Make yield and cut-out tests to determine justified cash premiums for meat-type hogs, and develop methods of reflecting premiums to producers.	Shen-Valley Meat Packers, Inc., Timberville, Va.	1,000
134	Develop new method and new official standards to measure bread-baking quality of wheat. (PMA)		
	<u>Objective of Contract:</u> Test flours made from identified samples of wheat as a basis for developing a quick, simple index of bread baking quality of wheat.	Doty Technical Laboratories, Kansas City, Mo.	5,000
163	Measurement of costs and margins in marketing farm products. (BAE)		
	<u>Objective of Contract:</u> Study marketing costs and practices in sample of retail stores handling fruits and vegetables.	Alderson and Sessions, Philadelphia, Pa.	36,870
	<u>Objective of Contract:</u> Costs of retailing meats in Chicago, Ill.	Roy C. Lindquist, Chicago, Ill.	2,500
	<u>Objective of Contract:</u> Costs of marketing eggs through different retail outlets.	University of Illinois, Urbana, Ill.	10,000
167	Reduction of waste through improved packaging materials and loading techniques. (PMA)		
	<u>Objective of Contract:</u> Determine causes of and, by transportation tests of loading and bracing methods, find ways to reduce damage to cantaloups, celery, lettuce, and carrots shipped from southwestern growing regions to eastern markets.	Western Growers Association, Los Angeles, Calif.	10,000
168	Transportation costs and their economic effects on agriculture. (BAE)		
	<u>Objective of Contract:</u> Measure transportation and handling costs for selected fresh fruits and vegetables in San Francisco Bay area terminal markets.	Stanford Research Institute, Stanford, Calif.	23,000



Proj. No.	Project Title and Objective of Contract	Contractor	Amount
168	Continued		
	<u>Objective of Contract:</u> Determine extent to which transportation charges, size and type of shipment, and other factors influence choice of carriers; study future trend of diversion from one type to another in shipment of citrus fruits and juices.	Agricultural Experiment Station, University of Florida Gainesville, Fla.	11,500
189	Improvement in marketing facilities equipment, and methods for storage of oilseeds and their products. (PMA)		
	<u>Objective of Contract:</u> Value of storage, structure and equipment requirements, kinds of facilities now used, availability and cost of commercial storage for varying periods, and feasibility of farm storage for stock and shelled peanuts; study harvesting and handling practices that are necessary.	Alabama Agricultural Experiment Station, Auburn, Ala.	6,000
		Texas Agricultural Experiment Station, College Station, Texas	6,000
		Virginia Agricultural Experiment Station, Blacksburg, Va.	6,000
205	General economics of marketing. (BAE)		
	<u>Objective of Contract:</u> Determine level of grain storage required on basis of variations in yield, needs of livestock and other industries; evaluate economic effects of alternative storage programs on prices, use, and storage facilities.	University of Chicago, Chicago, Ill.	15,000
	<u>Objective of Contract:</u> Improve procedures for collecting and using food expenditure data to measure consumer demand, especially for meats and foods used instead of meats.	Harvard University, Cambridge, Mass.	33,725
	<u>Objective of Contract:</u> Analyze marketing methods of Louisiana farmers in sale of specified farm commodities.	Southern University Baton Rouge, La.	1,000

Proj. No.	Project Title and Objective of Contract	Contractor	Amount
205	Continued		
	<u>Objective of Contract:</u> Measure factors accounting for year-to-year and seasonal changes in prices of seeds of principal hay and pasture crops.	Agricultural Experiment Station, University of Illinois, Urbana, Ill.	6,000
	<u>Objective of Contract:</u> Hog buying practices and policies as economic factors in efficiency of meat-packing plants.	Agricultural Experiment Station, University of Illinois, Urbana, Ill.	5,000
211	Developing and conducting educational and demonstrational work in marketing. (LXT)		
	<u>Objective of Contract:</u> Food marketing information for consumers, producers, and handlers in New England.	University of Massachusetts, Amherst, Mass.	25,000
	<u>Objective of Contract:</u> Inform and instruct retailers and other food handlers in New England on methods of reducing waste, lowering handling costs, and preserving quality; inform producers and consumers of results.	University of Massachusetts, Amherst, Mass.	12,000
	<u>Objective of Contract:</u> Food marketing information in New York area to advise consumers, improve nutrition, and encourage prompt movement of farm products.	Cornell University, Ithaca, N. Y.	22,000
	<u>Objective of Contract:</u> Furnish food and market information to consumers in Kansas City area.	University of Missouri, Columbia, Mo.	18,000
	<u>Objective of Contract:</u> Inform consumers on food selection, care, and preparation, and inform producers of consumer preferences, to aid orderly and economical movement of farm products.	West Virginia University, Morgantown, W. Va.	6,000
233	Development of new and improved methods for grading oilseeds and oilseed products and analysis of relationships of oilseed grades to out-turn and quality of oilseed products. (PMA)		



Proj. No.	Project Title and Objective of Contract	Contractor	Amount
233	Continued		
	<u>Objective of Contract:</u> Develop methods for rapid determination of oil content of small lots of cottonseed.	Battelle Memorial Institute, Columbus, Ohio	5,000
255	Research in utilization of television in dissemination of information regarding marketing of agricultural products. (INF)		
	<u>Objective of Contract:</u> Develop techniques in presenting market information by television to both consumers and producers, with emphasis on meat animals, poultry, and cereal grains.	Iowa State College of Agriculture and Mechanical Arts, Ames, Iowa	40,000
382	Development of new and expanded market outlets for oilseeds, fats and oils, and their products. (PMA)		
	<u>Objective of Contract:</u> Survey wholesale lard-processing plants to indicate economic significance of equipment, methods, costs of processing, volume, and other factors, in utilization and marketing costs of lard.	Iowa State College of Agriculture and Mechanical Arts, Ames, Iowa	17,500
	<u>Objective of Contract:</u> Determine purchaser preference for experimental peanut products, including size of package, kind of flavor, and methods of use.	Georgia Agricultural Experiment Station, Experiment, Ga.	1,500
389	Survey of marketing fruits, fruit products, and tree nuts. (BAE) (PMA)		
	<u>Objective of Contract:</u> Survey consumer purchases of selected fruits and fruit products.	Industrial Surveys Co., Chicago, Ill.	72,700
	<u>Objective of Contract:</u> In cooperation with industry groups, provide details of availability and inventories of certain fresh and processed fruits in retail stores.	Industrial Surveys Co., Chicago, Ill.	10,000

Proj. No.	Project Title and Objective of Contract	Contractor	Amount
419	Using farm cooperatives in testing new equipment and developing improved procedures to reduce specific citrus margins and handling costs. (FCA)		
	<u>Objective of Contract:</u> Cost of converting present commercial packing houses to bulk handling of citrus fruit, and comparative costs of handling in bulk and in field boxes.	Haines City Citrus Growers Association, Haines City, Fla.	3,721
462	A study of the effect of certain regulatory measures upon the quality of milk. (PMA)		
	<u>Objective of Contract:</u> Study effect of certain regulations and enforcement procedures and their application to actual conditions of production, processing, and distribution of fluid milk products.	National Academy of Sciences, Washington, D. C.	32,000
546	Determining methods of reducing poultry and egg handling, processing, and marketing costs by studying the operations and utilizing the facilities of producer cooperatives. (FCA)		
	<u>Objective of Contract:</u> Test poultry and egg handling, processing, and marketing methods; study effects on costs and operations.	Macoupin Locker Services, Inc., Carlinville, Ill.	720
550	Meeting dairy market sanitation and health requirements most economically. (BAE) (BDI)		
	<u>Objective of Contract:</u> Meeting dairy market sanitation and health requirements with low-cost physical facilities, and lowering marketing costs of fluid milk.	Doane Agri- cultural Services, Inc., St. Louis, Mo.	22,000
	<u>Objective of Contract:</u> Develop a rapid method for detecting presence of bitter weed flavor in milk.	Agricultural and Technical College of North Carolina, Greensboro, N. C.	27,000

<u>Proj. No.</u>	<u>Project Title and Objective of Contract</u>	<u>Contractor</u>	<u>Amount</u>
554	Coordinated selling of citrus fruit in Florida. (FCA)		
	<u>Objective of Contract:</u> Study and appraise fruit and vegetable grower-processor relations in other areas to aid coordinated selling of citrus fruit in Florida.	Utah Agricultural Experiment Station, Logan, Utah	1,000
558	Operating efficiency of agricultural marketing cooperatives. (FCA)		
	<u>Objective of Contract:</u> Check survey schedules obtained in study of operating efficiency of agricultural marketing cooperatives and record the data.	Kansas State Agricultural Experiment Station, Manhattan, Kans.	500
612	Milk sampling for butterfat content; a study of the most effective and economical method of obtaining satisfactory results. (FCA)		
	<u>Objective of Contract:</u> Effective and economical methods of obtaining satisfactory results in milk sampling for butterfat content.	Michigan Milk Producers Association, Detroit, Mich.	13,000
630	Analysis of worker productivity in marketing operations. (PMA)		
	<u>Objective of Contract:</u> Fundamental research to isolate and measure components of work productivity in agricultural marketing operations, and to classify and establish standard values.	Cornell University, Ithaca, N. Y.	45,000
Total of Research and Service Contracts, 1951, Title II .....			<u>766,985</u>



UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING ACT (RMA-TITLE II)

Agency Summary of Obligations under Agricultural Marketing Act Allotments,  
Fiscal Years 1951 Actual, 1952 and 1953 Estimated

Agency	Direct Work (Other than Contracts)			Contracts			Total		
	1951 Actual	1952		1951 Actual	1952		1951 Actual	1952	
		Estimated	Estimated		Estimated	Estimated		Estimated	Estimated
BAE .....	\$894,531	\$826,900	\$932,900	\$241,395	\$240,000	\$230,000	\$1,135,926	\$1,066,900	\$1,162,900
ARA:									
OA .....	124,826	122,800	122,800	-	-	-	124,826	122,800	122,800
OES .....	309,345	253,400	277,400	-	-	-	309,345	253,400	277,400
BHNE .....	12,915	8,700	5,700	-	-	-	12,915	8,700	5,700
BAI .....	23,328	20,600	19,600	-	-	-	23,328	20,600	19,600
BDI .....	25,771	19,000	19,000	27,000	-	-	52,771	19,000	19,000
BPISAE .....	348,272	297,000	351,000	-	-	-	348,272	297,000	351,000
BEPC .....	94,486	83,000	118,000	-	-	-	94,486	83,000	118,000
FS .....	43,679	24,000	39,000	-	-	-	43,679	24,000	39,000
PMA .....	2,135,339	1,879,300	2,053,300	353,400	259,000	274,000	2,488,739	2,138,300	2,327,300
FCA .....	190,385	177,500	201,500	22,190	21,000	21,000	212,575	198,500	222,500
EXT .....	581,667	497,200	557,200	83,000	80,000	75,000	664,667	577,200	632,200
OFAR .....	189,685	127,400	167,400	-	-	-	189,685	127,400	167,400
SEC .....	3,856	4,400	4,400	-	-	-	3,856	4,400	4,400
SOL .....	4,981	5,000	5,000	-	-	-	4,981	5,000	5,000
INF .....	25,837	25,800	25,800	40,000	-	-	65,837	25,800	25,800
Total .....	5,008,903	4,372,000	4,900,000	766,985	600,000	600,000	5,775,888	4,972,000	5,500,000

## BUREAU OF AGRICULTURAL ECONOMICS

### Purpose Statement

The Act which established the Department of Agriculture in 1862 described its duties in part as follows: "to acquire and diffuse among the people of the United States useful information on subjects connected with Agriculture, in the most general and comprehensive sense of that word\*\*\*\*." In addition it provided specifically for the "collection of statistics." A small beginning had been made on statistical work in the Patent Office and this work was taken over by the Department of Agriculture when it was established. The issuance of regular crop reports has continued ever since, the scope and coverage being increased from time to time by Congress.

The present Bureau of Agricultural Economics was formed on July 1, 1922, by the consolidation of the former Bureau of Markets and Crop Estimates and the Office of Farm Management and Farm Economics. The duties and responsibilities of this Bureau have been modified from time to time by law and by Secretary's directives. As now constituted, the Bureau of Agricultural Economics is the chief economic research and statistical agency of the Department of Agriculture. As a service agency, it supplies the Secretary's Office, other agencies, Congressional Committees, industry groups, and the public with statistical data and economic analyses relating to current and proposed Department programs and activities. As a staff agency, it is responsible for the coordination or general supervision of statistical matters and economic research throughout the Department. It acts as liaison agency with the Bureau of the Budget in the administration of the Federal Reports Act.

Two subappropriations provide for work as follows:

Economic Investigations: Research is conducted and information furnished on production and distribution of commodities; land utilization and conservation; farm management methods and practices; land ownership and values; utilization of farm products; purchasing of farm supplies; farm population, farm labor; farm finance, insurance, and taxation; adjustments in production to probable demand; costs, prices, and income in their relation to agriculture, including causes for variations and trends. Much of this work is performed in the field in cooperation with the Land Grant Colleges and other State institutions.

Crop and Livestock Estimates: Basic statistical and economic data relating to food and agriculture are gathered, analyzed and published, including acreages, yields, and production, stocks, values and utilization of farm crops; numbers, production, value and utilization of livestock and livestock products; and such related data as prices received and prices paid by farmers. Thousands of farmers, processors, merchants, and others serve as volunteer reporters and these reports are supplemented by field observations of the Bureau's statisticians and other data to provide the many estimates and reports issued for public information.

The Bureau's central office is in Washington, D. C., with program activities carried on from 41 State offices (covering crop estimating and other statistical work in all States). Cooperative work is being carried on with Land Grant Colleges or other State institutions in every State in the Union.

On November 30, 1951, the Bureau had 1,336 employees, of whom 677 were in Washington and 659 in the field.

	<u>Estimated, 1952</u>	<u>Budget Estimate, 1953</u>
Appropriated funds	\$5,407,304	\$5,565,000



Salaries and Expenses

	<u>Economic Investigations</u>	<u>Crop and Livestock Estimates</u>	<u>Total</u>
Appropriation Act, 1952 .....	\$2,150,000	\$2,848,304	\$4,998,304
Anticipated pay adjustment supple- mental .....	173,000	236,000	409,000
Base for 1953 .....	2,323,000	3,084,304	5,407,304
Budget Estimate, 1953 .....	2,507,000	3,058,000	5,565,000
Increase or decrease .....	+184,000	-26,304	+157,696

SUMMARY OF INCREASES AND DECREASES, 1953

Economic Investigations:

For research on farm costs and returns .....	+52,000
For analyses of economic problems of present and potential irrigation areas .....	+150,000
Decrease due to partial absorption of pay adjustment costs ....	-18,000

Crop and Livestock Estimates:

Decrease due to partial absorption of pay adjustment costs ....	<u>-26,304</u>
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PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase or Decrease: Pay Ad- justment Absorption	Other	1953 (estimated)
1. Economic investigations:					
(a) Economics of pro- duction .....	\$1,355,801	\$1,274,000	-\$10,000	+202,000(1)	\$1,466,000
(b) Prices, income and marketing .....	936,999	846,700	- 6,500	- - -	840,200
(c) Farm population and manpower .....	183,113	202,300	- 1,500	- - -	200,300
Subtotal .....	2,475,913	2,323,000	- 18,000	+202,000	2,507,000
2. Crop and livestock estimates:					
(a) Field crop estimates and reports .....	932,603	999,904	- 8,704	- - -	991,200
(b) Fruit, nut, and vege- table estimates and reports .....	402,429	431,700	- 3,600	- - -	428,100
(c) Livestock and poultry: estimates and reports ..	538,999	577,800	- 4,900	- - -	572,900
(d) Dairy estimates and reports .....	333,506	358,100	- 3,000	- - -	355,100
(e) Agricultural price estimates and reports ..	566,602	611,600	- 5,200	- - -	606,400

(Continued on next page)

Project	Increase or Decrease:				
	1951	1952 (estimated)	Pay Ad- justment Absorption	Other	1953 (estimated)
2. Crop and Livestock estimates: (cont'd)					
(f) Farm surveys and employment estimates and reports .....	\$ 96,934	\$ 105,200	-\$ 900	- - -	\$ 104,300
Subtotal .....	2,871,073	3,084,304	- 26,304	- - -	3,058,000
Unobligated balance .....	74,314	- - -	- - -	- - -	- - -
Total pay adjustment costs..	[- - -]	[432,000]	[- - -]	[+12,700]	[444,700]
Total available or estimate .....	5,421,300	5,407,304	- 44,304	(2): +202,000	5,565,000
Transfer in 1952 estimates :					
to "Expenses of Defense :					
Production, Executive :					
Office of the President":	+17,700	- - -			
Reduction pursuant to Sec. :					
1214 .....	+65,000	- - -			
Anticipated pay adjustment :					
supplemental .....	- - -	-409,000			
Total appropriation or estimate .....	5,504,000	4,998,304			

#### INCREASES AND DECREASES

(1) Increase of \$202,000 under "Economics of production" as follows:

(a) Increase of \$52,000 for research on farm costs and returns.

Need for increase: Costs and returns from farming need to be analyzed by types and sizes of farms in broadly similar farming areas. Information would then be available on returns that farmers operating under different conditions are getting for their own labor and investment, after paying their operating expenses. In this way returns on wheat farms, for example, can be compared with cotton, beef, dairy, and other types of farms in different parts of the country. Such current figures on investment, production, income and expenses by types of farms in the major farming areas are necessary for an understanding of the economic problems that farmers are facing in different parts of the country. This becomes especially important in the defense emergency when farmers are asked to produce at high levels, despite rising costs and limited supplies of fertilizer and other production goods.

Over-all figures on farm assets and liabilities, gross income, expenses and net incomes are necessary to measure economic conditions in agriculture as a whole. But in any one year there is a great deal of variation in income from one area to another and for different types of farming. In order to have current information on changes in farming for some of the principal farm situations, the Bureau has developed costs and returns series on a per farm basis for the principal wheat, cotton, corn, tobacco, dairy and range-livestock areas. This information covers changes in investment, production, gross income, expenses, net returns and other information for each year beginning with 1930.

(Continued on next page)



Information on year-by-year changes in these items on important types of farms in major farming areas is essential for analysis of the effect of prospective changes in prices, costs and other production conditions on incomes on different kinds of farms. This information is needed for effective administration of farm programs and to meet other requests for information on the effect of changes in prices, costs and other factors on farming and ranching in different parts of the country. Requests are increasing constantly for information on different kinds of farm situations. During the past year, for example, there has been a great deal of interest in how rising costs have affected the economic situation of farmers who are producing cotton, dairy products, and beef. A more adequate program of research on investments, costs, income and net returns by type, size, and location of farms is needed to extend the present series to other important types of farms, to provide more adequate information for maintenance of the present series, especially for estimating changes in costs, and for evaluating effects of prospective changes on net returns to specific groups of farms.

Plan of work: Up to the present time costs and returns series have been published for 16 major types of farms for the years 1930-50. The published series are representative of "commercial family-operated farms" of each major type. This group includes the bulk of commercial production in most areas. But a series is now in preparation for "small-scale farms" in the Southeast Piedmont and a series on Delta cotton plantations is contemplated. Eight new series are in various stages of preparation. Additional series are needed to reflect changes in other important farming areas. Estimates in the areas that are now covered also need to be analyzed more fully.

Additional studies are contemplated for the following areas and situations:

- (1) Delta cotton plantations
- (2) Coastal Plains cotton-peanut farms of Georgia and Alabama
- (3) Irrigated cotton farms
- (4) Southwestern cattle ranches
- (5) Fruit and truck farms
- (6) General farms in western irrigated areas

Work of this type is carried out in cooperation with State Agricultural Experiment Stations. Data from U. S. Census, PMA records, previous farm management studies, and other sources are utilized to the fullest possible extent, but field surveys are necessary to obtain certain information on current changes.

(b) Increase of \$150,000 for analysis of economic problems in present and potential irrigation areas.

Need for increase: Many new irrigation areas are coming into the settlement period as a result of large-scale development in recent years, especially in the Columbia and Missouri Basins. New reclamation development is also being projected. At the same time, farmers in older irrigation areas are encountering economic problems that require special study. In both the new and the old irrigation areas there is need for economic studies to determine the sizes and types of farms that have the best income prospects under the conditions that are likely to prevail in each area.



This type of information is needed in order to provide a guide for successful settlement of a new project, and to suggest ways of improving farming systems on the older projects to earn more satisfactory returns on investments already made. For example, the question of relative returns from farm flocks of sheep, beef and dairy cattle needs to be reexamined in the light of market prospects over a period of years. The net income estimates from these studies also will indicate the potential ability of farmers to pay construction and maintenance charges for water development.

Special economic problems encountered in development and settlement of irrigated land also need to be analyzed, including the cost of preparing land for irrigation, building construction, investment needs for equipment and livestock, and credit needs for farm development. Market outlets need to be explored in relation to prospective increases in production of specific products in different irrigation areas. The possible need for additional marketing facilities and other community services also requires analysis. Family living costs should be estimated and related to income expectancy for different types and sizes of farms as a basis for determining repayment possibilities. The possibilities of combining irrigation farming with the use of surrounding dry land and range need to be explored in order that the most efficient and profitable production from all the land resources of an area might be achieved.

The Bureau of Agricultural Economics will conduct a number of different types of economic studies reflecting a wide range of economic problems of great importance to irrigation agriculture and to the Bureau of Reclamation in connection with established projects as well as those in various stages of planning and construction.

Plan of Work: The Bureau of Agricultural Economics will work on the economic aspects of irrigation problems as a part of the Department program of research on irrigation that has been developed with the Bureau of Reclamation. The work described below includes the more urgent problems:

1. Determination of Farming Potentialities in Irrigation Areas. Appraisals will be made of farm income potentialities in selected areas scheduled for irrigation development. The results will indicate the sizes and types of farms that are likely to pay out best, as well as crop rotations and livestock combinations that are adapted to the soils and other production and market situations in the respective areas. In addition to serving as guides for successful settlement of a project, the net income results will indicate the amount that can be made available for payment of construction and maintenance charges for water development after consideration of the income needed for family living.

During the first year of the program, appraisals will be initiated in three areas scheduled for irrigation development. Location of these investigations in widely separated areas will furnish information on significantly different soils, climatic, and market situations that will provide the maximum possible use of results in other areas. The studies will be designed for appraisal and guidance of specific development projects, but some of the results obtained will have wider application on other proposed developments in the same general region. These economic studies will be made in areas where sufficient

soil surveys and crop research have been started to indicate crop adaptabilities and yield expectancies with different production practices on different types of soils in the area. In other words, the soil and crop research will indicate the crops that can be grown; the economic research will show how these can be combined into farming systems that will pay best.

Other economic studies of income potentials also will be made that will have region-wide application. For instance, it is important to know the place of livestock in irrigation farming systems, and potentialities for income improvement. A study will be made of the income results from farm flocks of sheep, beef cattle, and dairy cows on irrigated farms as an example of possibilities in the Northern Plains. A similar study should be made in the Columbia Basin. Expansion possibilities are much greater with livestock and forage systems of farming than with those that depend upon speciality crops for their success. Results from such studies will have great significance to determination of realistic income potentialities on specific project proposals as well as in providing information helpful to farmers in adjusting operations on present projects.

2. Farm Development, Settlement and Credit Problems. The full income potentials of farming on irrigation projects are seldom realized until some years after the land is open for settlement. Analyses of settlement and farm development processes are needed as guides to facilitating successful development and settlement. From studies of experience on selected irrigation projects much valuable information can be obtained both for improvement of conditions on established projects and for successful development of new projects. Studies for new projects will provide needed guides for settlers, credit agencies and other groups.

Among the specific subjects to be included in such studies are:

- a. The rate of farm development and increases in income achieved or reasonably to be expected.
- b. Alternative methods of farm development, their costs and results; for example, predevelopment including land leveling and putting in main farm ditches versus gradual development.
- c. Farm investment required for settlement, and additional investments during development period.
- d. Sources of capital and credit, terms and conditions, and relation of credit availability to rate of development and settler's progress.
- e. Debt and repayment experience and future possibilities on new projects.
- f. Changes, if any, that have been made in the sizes and types of farms after original settlement and reasons therefor.



- g. Fluctuations in annual income and reasons for variation.
  - h. Relation of various kinds of technical and other assistance to settler progress.
  - i. Changes in farm ownership and tenancy.
  - j. Progress of the project as a whole including its relation to the surrounding agriculture; e.g., combined use of surrounding grazing and dry farming land.
3. The Market Outlook and its Relation to Timing of Development and Potential Production from Irrigated Areas of Each Region. In order to determine income potentialities of farms in proposed development areas it is necessary to analyze the longer time market outlook for commodities which might be produced. Some cash crops such as potatoes have a rather limited market which could be easily flooded with a large increase in production. Careful appraisal of the potential size of the market is needed for many fruit and vegetable crops that would grow satisfactorily in irrigation areas, but profitable expansion is limited by the size of the market. Other products have a broader market outlet, but each commodity needs to be studied from the standpoint of potential increases in demand and the possible market opportunities, both nearby and distant.

Market studies are needed for appraisal of farming prospects in order to obtain satisfactory estimates of prices that might be received for products of the area as a basis for estimating prospective farm income. But most of the market outlook work can be done either on a national or regional basis if proper adjustments are made for local area variations in prices.

On the production side, there is need for a compilation of irrigation development in each region by projected completion dates, together with estimates of potential production from new irrigation areas both by specific products and for total output. These estimates can then be related to the market outlook and thus form the basis for revision in farm and project development plans.

(2) Decrease of \$44,304 due to partial absorption of pay adjustment costs. There is a decrease of \$18,000 under Economic Investigations, and \$26,304 under Crop and Livestock Estimates due to partial absorption of pay adjustment costs which will be met by curtailing services and by discontinuing the issuance of several minor reports.



## STATUS OF PROGRAM

### Current Activities

The work under this appropriation is carried under two subdivisions as follows:

- (1) Economic Investigations which cover research on the economic aspects of American agriculture including the collection, analysis, interpretation and publication of current and historical information; and
- (2) Crop and Livestock Estimates under which the Crop Reporting Service gathers basic statistical data on production, utilization, stocks, prices, trends, and related information affecting farm crops and livestock.

### Selected Examples of Recent Progress:

#### ECONOMIC INVESTIGATIONS

##### Economics of Production

1. Studies of Agriculture's Productive Capacity were made in 1951 in cooperation with the 48 Land-Grant Colleges and other Departmental agencies. The results from the appraisal of potential production in 1952 have been used extensively both in the Department and in the States in the development of 1952 production programs. They have been used also in development of production goals, in appraising the prospective unbalance between livestock and feed supplies and the feasible adjustments to alleviate it, and by State Extension Services in traveling exhibits, radio talks, news releases, and farmer conferences.

Estimates made in these State by State studies of the levels of production that could be attained by 1955 and maintained during a period of high level mobilization will be extremely helpful in directing agricultural programs in the years ahead and for appraising agriculture's needs in the allocation of scarce materials. Preliminary tabulations indicate rather limited possibilities for expanding crop acreages on a sustained basis, but that it is feasible to increase yields substantially by further adoption of improved crop and livestock practices. Supplies of feed grains could be increased about 17 percent with only a two percent increase in acreage. Hay yields could be increased by 10 percent and the carrying capacity of rotation pastures by 20 percent. Cotton and wheat yields could be increased by nearly a third. Livestock numbers could be increased and sustained at a considerably higher level than at present. But to reach these production levels would require twice as much nitrogen, and two-thirds to three-fourths more phosphate and potash fertilizers than were available in 1950. More labor-saving farm machinery would be needed to handle the increased production with a limited labor supply.

2. Farmers in the United States now produce about twice as much farm output for each hour spent at farm work as in 1910-14 (Figure 1). This doubling of labor productivity resulted from a number of causes the most important of which include higher crop yields, replacement of horses and mules by tractors, trucks, and automobiles as sources of farm power, greater production per animal and adoption of time-saving methods of performing farm jobs. The quantity of products resulting from an hour of work has increased both on farms and in industry during the last 30 years. Agriculture has kept pace with industry during the period beginning about 1933 and continuing through and after World War II. Preliminary estimates for 1951 indicate farm labor requirements for the United States at 18.1 billion man hours, compared with 17.6 billion hours in 1950 and 20.8 billion hours in 1944. Farm output in 1951 was about 8 percent above 1944.

Index numbers of production and related series for the United States and geographic divisions thereof are kept up to date. Farm output in 1951 was about 40 percent above the 1935-39 average. Output of livestock and livestock products was the greatest of record, but total crop production was below the record volume of 1948.

3. The volume of farm power and machinery on farms continues to reach new levels. Inventory volume of motor vehicles, other farm machinery, and horses and mules (measured in terms of 1935-39 dollars) on January 1, 1951 was 70 percent above the 1935-39 average. On the same date, farmers had record numbers of tractors, trucks, milking machines, grain combines, and mechanical corn pickers (Figure 2). Numbers of horses and mules on farms continued to decrease at a rapid rate. The present level of mechanization requires a steady volume of repair parts and replacement machines. There are also many opportunities for adoption of new labor saving machines such as cotton pickers and beet harvesters.
4. Studies of current changes in farm practices used by farmers were continued. Estimates developed during the past year show that 47 percent of the hay harvested in 1948 was baled, compared with 27 percent in 1944. Field forage harvesters handled one-third of the corn silage in 1948, but only 10 percent in 1944. About 20 percent of all small grain acreage and 9 percent of the corn acreage was sprayed or dusted for weed control in 1949. About 23 percent of the Nation's farms used liquefied petroleum gases in 1949. These kinds of research data have been widely used by machinery manufacturers and defense agencies in planning production programs in a period of raw material scarcity.
5. Estimates of costs and returns in 1950 were prepared for 16 types of farms in 8 major farming regions (Figures 3 and 4). Net farm income for all of agriculture was higher in 1950 than in 1949, but only 10 of the 16 farm types in these series showed income improvement. Most of these farm types reached their highest incomes in 1947 or 1948. Changes in net farm incomes from 1949 to 1950 ranged from an average increase of \$2,800<sup>per</sup> farm on winter wheat farms of central and northwest Kansas to a decrease of \$4,200 on wheat-grain sorghum farms in the Southern Plains. Net incomes declined on both



- dairy farm types. Preliminary indications are that net incomes in general were again somewhat higher in 1951 than in 1950, but again not all farm types fared alike. For instance, average net farm incomes of hog-beef fattening farms in the Corn Belt and dairy farms in the Northeast are estimated at 15 to 20 percent higher in 1951 than in 1950, but on Black Prairie cotton farms of Texas the net income was just about the same as the year before despite a considerable increase in production on those farms.
6. A number of studies have been made on the economic utilization of farm grown feeds. Prevailing practices for utilization of grass silage in Wisconsin could be modified to reduce costs and give better results in terms of quality of feed produced and milk production. In Colorado different methods of harvesting, storing, and feeding alfalfa showed that in comparison with stacked alfalfa, windrow chopped alfalfa yielded \$1.84 higher net returns per hundredweight of gain from fattening steers, windrow baled alfalfa produced \$1.05 higher net returns, while ensiled alfalfa yielded \$0.26 lower net returns.
  7. An economic evaluation has been made of improved practices in the management of pasture and hay crops on dairy farms in central Pennsylvania. It was found that on only a few farms in the area is a pasture program planned to provide adequate grazing throughout the season. The income from a suggested system of farming on a typical farm that would not change the number of cows would increase net cash income 11 percent compared with the usual management. But production of roughage would be increased about 15 percent and production of pasture about 65 percent. The additional quantity and better quality of forage crops would provide feed for increasing production per cow from 7,000 pounds to 8,225 pounds of milk per year. If the land now used for wheat were shifted to grasses and legumes and the number of cows increased from 18 to 24 the net cash income of the same typical farm would be raised 25 percent.
  8. A study of pasture possibilities in the Piedmont area of South Carolina shows that the development of grazing systems for intensive use requires a large investment of capital in the form of seed, fertilizer, lime, labor, power, and machinery. Preliminary analyses indicate that with present prices, it will cost \$60 to \$75 per acre (including fencing but excluding value of land) to develop a good permanent pasture. However, a pasture of this kind has a very high carrying capacity. Capital requirements, excluding land but including the cost of pasture development, for a 25-cow grade A dairy in the Piedmont area of South Carolina are about \$22,000.
  9. A cooperative project with the Michigan Agricultural Experiment Station showed that the average Michigan dairy farmer can reduce milk production costs by as much as 35 percent by the adoption of improved production practices. The dairyman who has average producing cows and adopts these improved production practices without any change in the producing ability of his cows can increase his labor income by 60 percent. If, in addition, he is successful in



upbreeding his cows to good producers he can increase his labor income three-fold. It appears possible to reduce feed costs in producing 100 pounds of milk by 14 to 16 percent by the feeding of higher quality roughage.

10. In the Missouri Basin analyses have been made of data on crops grown, crop yields, cropping practices and farming systems in presently irrigated areas having soil and climatic conditions similar to those in selected areas proposed for irrigation. Data also were collected and summarized for selected dryland areas. Collection and analyses of such data is an essential preliminary step in appraising income potentials in the proposed irrigated areas and comparing them with dryland farming. The work is cooperative with the Agricultural Experiment Stations in Montana, Nebraska, North Dakota, and South Dakota. Preliminary budgets have been prepared to show the transition problems and income potentials of irrigated farming in the Cannon Ball area of North Dakota, and basic data have been developed for preparing budgets for irrigated farms in the Oahe Unit of South Dakota and in central Nebraska.
11. Important information is coming from a series of studies on the economics of farm mechanization. For instance, a study in California shows that machine harvesting of cotton in 1949 cost \$14.65 per bale for machine picking, \$10.32 per bale for grade loss and \$1.20 for field waste--a total of \$26.17 per bale compared with \$45.00 per bale for hand picking costs, or an average saving of \$18.33 per bale to farmers for machine picking. Over one-third of the crop was picked by mechanical harvester in California in 1950. Mechanical harvesting and other aspects of cotton mechanization also are being studied in Mississippi, Texas, and the Carolinas.
12. Work on economic evaluation of electric power consumption in nine selected areas in eight States indicates that in each of the study areas farmers have continued to buy more electrical equipment and to use more electricity regardless of the length of time the farms have had service from central-station sources (Figure 5). For the ten years studied, the per-farm increases in the use of electricity have ranged from about 20 percent per year in eastern Washington to 7 percent in southwestern Kansas. There is no indication of a leveling off in the use of electricity. Farmers want equipment that will decrease costs of farm production and increase labor efficiency. And they also want equipment to ease the work of the homemaker.
13. Preliminary analyses of low production farms have provided measures of labor resources and productivity for these farms. For the one million farm families operating "small-scale farms," having a value of products from \$500 to \$1,200, gross product per man averaged only about one-fourth the product per man on "medium commercial-family farms," or those whose products are valued between \$3,000 and \$8,000. Small-scale farms are most common in the Appalachian, Southeast and Delta States where they represent two-fifths of all farms. Troublesome farm adjustment problems are found also on many of the "small commercial-family farms," whose products are valued between

\$1,200 and \$3,000. Gross product per man on these farms averaged only about one-half that of medium commercial-family farms.

14. A preliminary estimate of the annual Balance Sheet of Agriculture indicates that, measured in current dollars, agricultural assets increased about 13 billion dollars in 1951. Total assets on January 1, 1952 were approximately 156 billion dollars. Nearly 9 billion dollars of this increase was in the value of farm land and buildings. The remainder of the increase was in other physical assets, particularly livestock, motor vehicles, and farm machinery. There was no significant change in the aggregate of financial assets owned by farmers. Although farm debts increased almost 2 billion dollars, the equities of farmers and other owners of farm properties appear to have increased during 1951 more than 11 billion dollars to a total of more than 141 billion on January 1, 1952 (Figure 6).

The greater part of the increase (about 90 percent) in the assets of agriculture during 1951 resulted from higher prices - especially of farm real estate. However, there were also significant increases in the physical inventory of livestock, motor vehicles, and machinery on farms; and farmers continued to increase their investment in farm and home improvements.

The liquid financial reserves of farmers - bank deposits, currency, and United States Savings Bonds - decreased about 100 million dollars during 1951 to about 19.6 billion dollars on January 1, 1952. There was no apparent change in farmers' holdings of currency and bank deposits. However, United States Savings Bonds cashed in 1951 exceeded the volume purchased by farmers, and despite accrual of interest the redemption value of bonds owned by farmers decreased about 100 million dollars during the year.

The decline in the liquid financial reserves of farmers during 1951 was offset by an approximately equal increase in the value of farmers' investments in cooperative associations. Thus the total of all financial assets owned by farmers was about the same on January 1, 1952 as a year earlier - 21.9 billion dollars.

A preliminary estimate of the non-real-estate farm debt on January 1, 1952 indicates a total of 8.1 billion dollars. Of this, about 0.7 billion dollars were nonrecourse, price-support loans made or guaranteed by the Commodity Credit Corporation. These CCC loans were approximately 100 million less than a year earlier. Excluding these loans, the non-real-estate farm debt is estimated to have increased during 1951 from 6.2 billion to a record level of about 7.4 billion dollars. These short-term debts, which are incurred chiefly to meet production expenses and to buy livestock and machinery, were more than 2-1/2 times as large at the beginning of 1952 as at the beginning of 1946 (Figure 7).



Increases in non-real-estate debt during 1951 occurred in all regions. However, they were most marked in the Midwest, West, and Southwest. These three regions had a large increase in livestock production and the Southwest also had an exceptionally large increase in cotton acreage (Figure 8).

A preliminary estimate of farm-mortgage debt on January 1, 1952 indicates a total of about 6.3 billion dollars, compared with 5.8 billion dollars on January 1, 1951. This increase of about 8 percent during 1951 compares with annual increases of 8 percent in 1950, 6 percent in 1949, 5 percent in 1948, and 2 percent in 1947 and in 1946.

Every State in the Union experienced an increase in farm-mortgage debt during 1950 just as in 1949 (Figure 9). On January 1, 1951 every State except Illinois, Iowa, Minnesota, Nebraska, North Dakota, and South Dakota had more farm-mortgage debt than on January 1, 1946, the lowest point since 1913 in farm-mortgage debt for the United States. The highest volume of farm-mortgage debt shown in the Bureau series for the United States was reached on January 1, 1923. On January 1, 1951 the farm-mortgage debt for the country as a whole was only 54 percent of the 1923 volume, yet 12 States had a higher debt than in 1923.

15. Studies of the operating practices of farmers' mutual insurance companies were continued. A bulletin on crop-hail insurance analyzed types of coverage, costs, factors to be considered in the selection of a policy, settlement of claims, and various situations under which crop-hail and Federal all-risk insurance are supplementary. A bulletin on windstorm insurance presented loss distributions showing why a deductible policy is particularly applicable to farm property. The degree of variability in company losses over time was explored in relation to safety-fund and reinsurance needs; and the status of the specialized farm mutual windstorm companies, with respect to accumulated safety funds and reinsurance arrangements, was examined in relation to the yardsticks of need.
16. Reports from farmers' mutual fire insurance companies indicated that losses averaged 14.3 cents per \$100 of insurance in 1950, compared with 13.9 cents in 1949 - a 3-percent increase in the loss rate. These companies had about 8 percent more insurance in force at the end of 1950 than at the end of 1949. Property values and replacement costs were up, so that the combination of more valuable property and higher loss rates per unit of value resulted in an estimate of farm fire losses amounting to 102 million dollars in 1950, compared with 95 million in 1949.
17. Farm real estate taxes levied per acre in 1950 (payable largely in 1951) were 5 percent above those for 1949. The increase in 1950 marks the sixth consecutive year in which the average for the country as a whole has risen since the end of World War II. By States, the change has varied considerably, however. Taxes per \$100 of full value were lower in 1950 than in 1949, but slightly above the 1948 figure. Average taxes per acre for 1949 had already set an all-time record. Taxes



per \$100 full value, on the other hand, are still well below their peak level in 1932. Personal property taxes have shown increases comparable to those for real estate taxes. Preliminary estimates indicate that 1951 levies payable largely in 1952 will show another increase of 5 percent.

18. Estimated Federal income taxes paid by farmers in 1951 on 1950 income indicate a third consecutive decline in recent years although at a slower rate. The amount dropped to 640 million dollars from 675 million in 1950 and from the peak of 960 million reached in 1948. These figures emphasize the relatively lower net income position of farmers in 1949 and in 1950 before the start of the Korean conflict. Federal income tax payments of farmers in 1952 are likely to be higher than in 1951.
19. In the study on risk-bearing in agricultural production special attention was given to alternative financial measures whereby farmers might attain greater stability of income. The costs, benefits, and probable effectiveness of the following measures were studied for wheat farms in Kansas and North Dakota: Accumulation of financial reserves, holding reserves of grain, wheat crop insurance and multiple-crop insurance, and the use of emergency credit. Attention also was given to the contribution of farm-management practices, such as summer-fallowing to yield stability. The relation between wheat yield variability and land values was investigated in a specialized wheat area.
20. Farm real estate values continued to advance in nearly all States during the 4 months ending November 1, 1951 but the average increase of 2 percent was but half that reported during the same period a year ago (Figure 10). At 206 (1912-14 = 100) the United States index as of November 1 was 15 percent above a year earlier and 20 percent above July 1950. In terms of pre-war (1935-39 = 100), the index is now at 249 (Figure 11).

Some slackening in the volume of sales as compared with a year earlier was reported by real estate dealers in October 1951. For the 12 months ended March 31, 1951, sales were up 6 percent from the previous year but still about one-third below the post-war peak reached in 1947. Sales data from the March survey indicated that nearly one-third of the farms sold during the fall and winter of 1950-51 were bought by non-farmers. Purchases by nonresidents with intentions to lease were more frequent than in recent years. The proportion of sales for cash and the ratio of cash down payments to purchase price were slightly higher than in the previous year.

21. Gross rents payable on leased lands totaled about \$3.2 billion in 1951, or 8 percent more than in 1950, according to preliminary estimates. The value of crop-share rents was up only 5 percent, however, while cash rents and livestock share rents were up about 20 percent. Landlords paid out more for taxes and operating expenses than in 1950, leaving about \$1.9 billion as the net value of rent for leased farm property valued at \$27.6 billion on March 1, 1951. This represents a

rate of return of slightly less than 7 percent on current valuations, a substantially lower rate than prevailed during 1946 and 1947.

22. Studies dealing with various aspects of the economics of water resource development have been carried on in cooperation with Federal and State agencies administratively responsible for water projects and with a number of State Agricultural Colleges. Studies of settler progress on selected irrigation projects in the Missouri Basin in cooperation with the Montana, North Dakota and South Dakota Agricultural Experiment Stations indicate the potential contribution of specially designed programs to the financial success of settlers with few resources of their own. Among the measures that contributed most were predevelopment of farm units, which made essentially full production possible at the time of settlement; provision of land credit under flexible repayment arrangements, which allowed settlers to invest their own resources in working capital; and furnishing technical advisory service. The settlers on these projects also have benefited from rising farm prices during the period following settlement. These studies indicate that predevelopment, suitable credit arrangements and technical assistance warrant serious consideration in new land settlement programs.

Studies of reservoir inundation impacts undertaken at the request of State committees in Nebraska and South Dakota show the serious problems caused by the displacement of farm families and of entire communities in reservoir areas. They indicate that certain modifications in prevailing compensation and land acquisition practices should be adopted in order to alleviate adverse effects of reservoir developments.

23. An inventory of water resource development in the Southwest indicates that approximately 3,000,000 acres of new irrigation have been developed in the 1940-48 period. Most of this expansion was in Texas, where the 9-year increase in irrigated acreage amounts to almost 1,840,000 acres. Approximately 75 percent of the new irrigation in the Southwest depends on water from underground sources.
24. The land use inventory shows a continuation of a gradual upward trend noted previously in acreages of land improved for crops and permanent pastures. The annual acreage planted to crops and in fallow preparatory to planting (exclusive of rotation pasture) is now above 385 million acres, - higher than the previous peak of some 380 million acres in the early 1930's. Significant shifts also have been made between uses. For example, the acreage devoted to row crops in the South has been reduced, while hay and pasture have greatly increased.
25. A number of studies of farm operating agreements and leasing arrangements have been undertaken in cooperation with State Agricultural Experiment Stations and Regional Tenure Research Committees. Studies of father-son operating agreements indicate that satisfactory arrangements can be worked out for a young farmer to enter farming. Many of the difficulties that frequently prevail can be overcome by use of



a suitable agreement. The types of father-son agreements that have proven successful include: project agreements, joint-operation agreements, wage and income-sharing agreements, lease agreements, and combinations of these types. Such agreements have been effective in giving the son training in management of the farm, providing him with a reasonable chance to accumulate capital, allowing security for parents, and keeping up the productivity of the farm. Equitable intra-family agreements also have been worked out whereby the ownership of the farms may eventually be transferred from parents to children.

For non-related landlords and tenants, research has indicated ways of making changes in farm leasing arrangements more responsive to changes in farm production practices and thus provide: (1) greater security of tenure; (2) more equitable handling of costs for conservation practices and installations; (3) introduction of livestock in a cash crop economy; and (4) more clearly defining the responsibilities of the two parties.

#### Prices, Income, and Marketing

1. The farm income estimates of the Bureau are the best general measures of the economic position of the farmer. They are of special use to Congress and to Administrators in appraising the need for and effectiveness of farm programs as well as to business men in evaluating the extent of the farm market for their products. Total cash receipts from farm marketings in 1951 are tentatively estimated at 32.8 billion dollars; or 14 percent above the previous year. Cash receipts from meat animals, dairy products, and poultry and eggs were all substantially higher in 1951 than in 1950. The total for all livestock items was about 19.8 billion dollars, or 22 percent above 1950. On the other hand, total crop receipts were up only 3 percent to approximately 13 billion dollars, a substantial increase for cotton having been largely offset by declines for some of the other principal crops.
2. The Bureau continued to prepare annual Nation-wide estimates of gross farm income, the expenses of farm production, and the realized net income of farm operators. Considerable attention was also devoted to major revisions in these basic estimates and in the various series derived from them. All of the series, with revisions extending back to 1910 in some cases, were republished in this year's report. Gross farm income in 1951 is tentatively estimated at 37.5 billion dollars, or 14 percent more than in 1950. Farm production expenses totaled about 22.5 billion dollars -- 12 percent more than in 1950; and farmers' realized net income, estimated at 15.0 billion dollars, was up 18 percent from its postwar low in 1950 (Figure 12). However, it was still 2 billion dollars less than in 1947; and with the cost of farm-family living at an all-time high in 1951, the purchasing power of farmers' realized net income was down 20 percent from 1947 -- and lower than in any year from 1942 through 1948 (Figure 13). The outlook for 1952 indicates a possibility of some further increase in both gross farm income and production expenses; but realized net income may show little change.



3. The demand for farm products is appraised monthly in the Demand and Price Situation. Special emphasis has been given to analyzing the impact of increasing defense expenditures on agricultural prices and income. Increasing employment and consumer incomes have been reflected in a strong demand for food and other farm products. From mid-1950 to mid-1951, per capita consumer incomes (after taxes) increased 11 percent and food expenditures increased about the same amount (Figure 14). Foreign takings of U. S. farm products also increased in 1951 over 1950. The value of agricultural exports in the third quarter of 1951 was nearly one-third larger than in the same period in 1950.

Both prices received and prices paid by farmers rose substantially following the Korean outbreak (Figure 15). However, prices received by farmers declined from February to September largely as a result of the record farm output in prospect. By mid-September average prices received by farmers were 7 percent lower than in mid-February. In the last quarter of 1951, some deterioration in crop prospects, notably cotton and corn, brought somewhat higher prices to farmers. Prices paid by farmers (including interest, taxes, and wage rates) rose to a record high in mid-November. The parity ratio in mid-November was 106, one point above November 1950 and 7 points below the ratio in February 1951. With average weather, agricultural production is likely to increase further in 1952. Average prices received by farmers in 1952 may not differ much from 1951. However, prices paid by farmers and farm production costs are virtually certain to increase.

Special analyses relating to agricultural prices and income were prepared for the Economic Council of the President and the Economic Stabilization Agency. Further work was also accomplished on appraising the long-range prospects for agriculture which is useful to other Government agencies in evaluating flood control, river basin developments, conservation, and other public projects and in establishing policies for long-term mortgage lending.

4. Current developments in the food sector of the Nation's economy are summarized in The National Food Situation, which carries reviews of the supply and distribution of United States food and the factors influencing retail food prices. Per capita food consumption in 1951 averaged about 13 percent above the prewar (1935-39) average rate and slightly above the 1950 rate. Consumption of such foods as pork, poultry products, cheese, fluid milk and cream, margarine, and most processed fruits and vegetables was substantially greater in 1951 than in years preceding World War II; whereas consumption rates for veal, lamb and mutton, butter, fresh fruits, potatoes, sweet potatoes, and flour were much smaller (Figure 16). For 1952, the per capita consumption of food is expected to be slightly higher than in 1951.

A special study, prepared in cooperation with other agencies was made of the distribution of the United States food supply in 1950-51, with special reference to exports. Food exports of about 43.5 billion pounds in 1950-51 accounted for 14 percent of the total physical

quantity of U. S. food distributed. They were 4-1/2 times the prewar (1935-39) average level, and 25 percent above the 1949-50 level. This study is the only summary of the year which gives food exports by major commodity groups and country, and indicates their importance in the over-all food picture.

5. The Commodity Situation Reports which cover all of the major groups of farm commodities have been continued with special emphasis on data and analyses of immediate importance to the Defense program.

(a) In appraising the current and prospective economic position of meat animals and meat, progress has been made in statistical work and economic analysis, and the Livestock and Meat Situation has been issued regularly. Some redirection of effort followed the new emphasis on national defense and mobilization, not only as it modified the outlook for meat animals but also as it required special projects such as an estimate of meat supplies, as a strategic resource, for the next three to four years.

There was a shift in mid-1950 from a downtrend to an uptrend in demand and prices for meat animals -- an uptrend that continued, especially in the case of cattle and lambs, until affected by price controls in early 1951; and a sizable increase in livestock numbers during 1950 and 1951 that gave promise of a larger output of meat in future years but also began to draw on reserves of feed supplies. An increase in meat production should be realized in 1952. Most of the increase will be in beef and veal.

(b) Appraisal of the current and prospective economic position of the various dairy products confirmed previous indications that for a given increase in income, consumer demand increases less for some dairy products than it does for some major products that are competitive with dairy products, both at the producer and consumer levels.

Net income from dairy farming in 1952 probably will be about the same as in 1951. With milk production expected about the same and consumer demand stronger, prices of dairy products -- and cash receipts from marketings -- probably will be somewhat higher than in 1951. However, higher costs are expected to offset the increase in cash receipts.

(c) Special emphasis was given to the influence of the national emergency on food grain requirements and prices, and the current and prospective supply position. Service work included furnishing information and participating in meetings of interagency subcommittees and committees on grain supply estimates, domestic consumption levels, production guides, export shipping schedules, and price ceilings. A study was made relating to levels of food grain storage, and long-term estimates were made in connection with waterway development programs.



(d) Studies on the prospective feed supplies and requirements revealed the need for adequate feed grain reserves and for conserving feed supplies under the current emergency situation. These studies reveal prospects for a tighter feed supply situation and a further drain on stocks of feed grain. Studies on longer term and current feed-price relationships, published in January 1951, serve as a basis for appraising current price relationships.

A study of the long-term trends in corn utilization revealed that the corn released by reducing horse and mule numbers over the past 40 years has accounted for much of the 50 percent increase in feed fed to livestock for food products. As the shift to mechanical power is nearing completion, further increases in requirements of meat, milk, and eggs for the expanding population will place new emphasis on increasing production of corn and other feeds (Figure 17).

(e) Some of the more important facts concerning the current situation for cotton and related fibers are:

(1) The world and United States supply of cotton in 1951-52 probably will not permit any significant increase in stocks over 1950-51;

(2) because of small foreign stocks at the beginning of the crop year and increased supplies of dollars and gold in foreign countries, exports of United States cotton in 1951-52 are expected to run between 5.5 and 6 million bales as compared with 4.2 million in 1950-51;

(3) domestic mill consumption of cotton in 1951-52 will probably be somewhat below the high level maintained in 1950-51;

(4) the price received by farmers for cotton in November 1951 averaged 41 cents per pound, about the same as in November 1950; and

(5) the yield per acre of cotton has shown a steady increase since 1925 (Figure 18).

An analysis of The Jute and Hard Fibers Situation was published in July 1951. New statistical series were started for manufacturers' sales and inventories of cotton textiles, wholesale price indexes of cotton goods, prices of acetate rayon, and for production, manufacturing, prices, imports, exports, and consumption of jute and hard fibers.

6. Changing prices and food costs and price regulations have led to a greatly increased interest in data on how consumer expenditures for food are divided between farmers and marketing agencies. Farm-retail price spreads, the farmer's share of the consumer's dollar and other data relating to marketing methods and organization are compiled, analyzed, and regularly published in The Marketing and Transportation Situation.

For instance, it is estimated that consumers in the United States are still spending about the same proportion of their disposable income for food as they were "pre-Korea" -- that is, 26 percent of



consumers' disposable income went for food in both the second quarter of 1950 and the third quarter of 1951. The total bill for marketing farm food products reached a record high of 20 billion dollars. A larger total is expected in 1952 because of an increased volume of commodities to be marketed and higher marketing costs.

The retail cost and farm value of the "market basket" of farm food products (prewar average annual purchases per family of three consumers) established record highs of \$726 and \$371, respectively. Retail prices averaged near this level throughout 1951, farm prices for food products averaged 3 to 4 percent lower and marketing charges have been higher by about the same amount in the second half of the year. The outlook for 1952 indicates that the farmer's share may be slightly below the average of 50 cents received in 1951. The farmer's share in 1951 was well above the levels of the 1930's but below the share received in the years 1943 to 1948.

Research relating to the marketing of specific commodities and the operations of particular marketing agencies has been designed to provide the basis for increasing the efficiency of handling farm products and promoting the adjustment of production patterns and marketing methods to changing needs and conditions, including the scarcities of the current defense economy.

7. A study of patterns of consumption and preferences for fruits showed that a large majority of a representative sample of commercial and institutional bakers in Chicago expressed a favorable attitude toward the use of dehydro-frozen fruits for baking. This indicates an interesting potential market for dehydro-frozen fruits, particularly apricots and peaches whose existing fruit forms do not entirely meet the needs of the baking industry.
8. A study of new frozen concentrated apple juice and its appeal to consumers in two test markets indicated that this juice made by methods developed by the Western Regional Research Laboratory stands a reasonable chance of success in commercial production and distribution. Predicated on the results of studies published by the Bureau of Agricultural Economics in cooperation with the Northwestern apple producers and the Western Regional Research Laboratory, a large commercial concern is presently planning to produce and distribute a sufficient amount of this frozen concentrated apple juice to distribute in one entire region during the coming marketing season. The successful development of frozen concentrated apple juice would assist in disposing of surplus apples which are not presently marketable in fresh form, particularly "C" grade and cull apples of the Delicious variety.
9. A study made under contract with a private research organization indicates that vegetable protein materials may become increasingly important in several industrial uses, particularly the field of regenerated fibers as a replacement or supplement to some natural protein and synthetic fibers. At the same time, this study also indicates that such fibers have definite limitations and are still far from being

satisfactory substitutes for material fibers for clothing use. Other promising industrial outlets for vegetable oilseed protein materials include paper coating and adhesive applications. The expectation is that a great deal of future research in agencies dealing with physical research will be oriented to the major findings of the report on industrial utilization of protein materials.

10. Much work has been done in cooperation with other Federal and State agencies to provide information basic to the development of a more efficient livestock marketing system in a number of areas.

Livestock slaughter in the Western region increased from three billion to six billion pounds liveweight annually in the last 25 years. Population increased two-thirds in the same period. Associated with the increase has been an eastward shift of the line of east-west movement which separates the livestock supply areas for the eastern and western concentrated consuming areas. Livestock slaughter has become increasingly decentralized in the Western region. Livestock auctions have increased in importance until larger numbers of livestock are marketed through auctions than through the terminal public markets within the confines of the Western region.

The attention of farmers, market operators, and packers has been directed toward the need for greater accuracy of pricing livestock according to the value delivered by each farmer. Several packers are now buying hogs on a carcass basis. A number of packers, including two of the big four, are experimenting with the purchase of hogs on a live grade basis rather than on the flat price basis formerly used. A study in Wisconsin indicates that errors in estimating yield and grade and errors of arriving at price of veal calves are rather substantial. Of the 570 calves in the study, 242 were priced at \$2.00 or more per hundred pounds above or below their actual value. The earlier Minnesota studies also indicate substantial pricing errors for hogs and cattle when marketed by the usual liveweight methods.

11. A study of cooperative cheese plants in an important commercial cheese-producing area reveals that in plants of all sizes unit costs decline with increasing volume, lowest unit costs being found in the larger plants. Overall economies can be achieved in the industry, with higher prices to producers, by consolidating small plants into larger ones, which may also perform a number of by-product manufacturing operations. It is believed that these important results can have much wider geographical application.

#### Farm Population and Manpower

1. The farm population decreased by nearly 5 million between April 1940 and April 1950, according to revised estimates made by the Bureau of Agricultural Economics and the Bureau of the Census. The revised series show that the farm population reached its peak in 1916 when 32,530,000 persons were living on farms. Farm population declined during World War I, increased in the two years following the end of



that war, and declined rather steadily throughout the 1920's. In 1939 there were 29,450,000 people living on farms according to the new definition. Farm population decreased sharply from 29,047,000 in April 1940 to a low of 24,342,000 in April 1945 at the peak of World War II. Following V-J Day, farm population increased -- mainly due to returning veterans -- in the next two years and reached a postwar peak of 26,147,000 in April 1947. After this time, there was a resumption of the long-time downward trend in the number of persons living on farms and in April 1950, the farm population in the United States was about the same as at the end of World War II -- 24,335,000 persons. The proportion of the Nation's population living on farms dropped from 22 percent in 1940 to 16 percent in 1950 (Figure 19).

2. Defense mobilization has accentuated losses of farm manpower. During the first half of 1951 farm employment averaged 373,000 lower than in the corresponding months of 1950. Increases in defense industry employment as well as increases in the size of the armed forces are important factors in the decline in the farm labor force. The impact of these losses has been only partly counterbalanced by declining labor requirements as a result of increasing farm mechanization. Further analysis is being made of the impact of the emergency on farm manpower in different areas and types of farming situations. A survey on farm manpower losses, available supply, and requirements for farm production is under way in Wisconsin and other surveys are being planned. Special attention is being given to areas of labor shortages and to areas of potential supply of farm labor.
3. Farm wage rates rose 12 percent in the 12 months preceding July 1, 1951, to an average of 62.4 cents per hour. Special analysis of the trends in farm wages has been made for the Wage Stabilization Board. This showed a wage freeze tied to a specific date in agriculture cannot work because of the great seasonality of hired farm employment and the changing nature of farm jobs performed in different parts of the year. Between January and September the employment of hired workers increases seasonally from 1 million to about 4 million.
4. There were approximately 1.1 million migratory farm workers in the United States in 1950 according to a survey of seasonal farm laborers. This total included about 600,000 Mexican Nationals in addition to 500,000 domestic migratory farm workers. The survey also showed that a larger proportion of migratory workers were single than of non-migratory workers, 54 percent compared with 38 percent, but that those who were married had more children than nonmigratory farm workers.
5. That the larger the scale of farming operations, the higher were the average net returns not only per farm but per man-year of labor was shown by a study of economic size class of farms in relation to the man-years of labor used. The 100,000 farms in the United States that are in the highest economic size class averaged a realized net farm income of approximately \$25,000 per farm and \$4,750 per man-year



of labor in 1944. In California the average net income per farm for this size class was \$49,000, for Iowa it was \$22,500, and for Texas it was \$28,400. The 409,000 farms in economic size class II averaged in 1944 a net farm income of \$6,400 per farm. In size class III there were 1.2 million farms and their average net farm income was \$3,000. In economic size class IV, which is the class of small commercial family farms, the average net farm income per farm was approximately \$1,300 in 1944. The remaining 2.5 million farms were in the part-time, small and nominal unit farms and their net farm incomes average the lowest.

#### CROP AND LIVESTOCK ESTIMATES

This appropriation finances the operations of the Crop Reporting Service, the organization for gathering the basic State and National statistics on production, prices, stocks, values, movement, and other agricultural information, the maintenance of regular series and the conduct of statistical research relating thereto, as shown by the following examples:

1. Additional personnel have been devoted to the improvement of the work on agricultural prices during the past year. Added funds for the fiscal year 1951 have provided a start on a long-needed program to investigate and devise means of strengthening reporting methods, analyses and estimates for both prices received and prices paid by farmers. Twelve field offices, representing 17 States, were selected to direct special attention to these new studies and developments. Extra technical and clerical help was assigned. Lists of price reporters have been analyzed for adequacy and representativeness, price data have been reviewed with respect to adequacy and bias, and specific programs have been put into operation, designed to effect improvement in the price series, State by State, and commodity by commodity.

As part of this improved program on agricultural price statistics, special surveys were made of marketing channels for farm products. These enumerative surveys were conducted in New York, Georgia, and Nebraska to secure sample indications as to details of farm products sales in these areas, the position at which sales are made, the type of dealer through whom sales are made, and the relative proportion of sales involved. These basic details are essential in order to properly evaluate and weight reported price data in deriving price averages.

A remarkably satisfactory method was developed for securing a more reliable current estimate of the Parity Index (Index of Prices Paid, Interest, Taxes, and Wages) in the quarter months beginning with March. The final index of prices paid is based upon quarterly reports of independent stores, but these indications have not been available in time for use in the current quarter month. Chain store price changes, heretofore used as a guide, have not been wholly dependable as an advance indicator of the probable changes in independent store prices. Under the expanded program, provision was made to accelerate the analysis of independent store prices for a

sample of returns from 19 States currently in the quarter month, and this has yielded a much closer preliminary measure of the later 48-State analysis.

2. Parity prices for 155 agricultural commodities were reworked in January 1951. This was done to reflect the change caused by the use of the January 1941 - December 1950 average in place of the January 1940 - December 1949 average, as required by law. Of the 166 commodities for which parity prices were published in November 1951 127 were compiled on the "new" basis, 5 on the "old" basis, and 34 on the "transitional" basis. A similar recalculation is underway in January 1952.
3. Both the Washington commodity statisticians and the field technical staff have participated in the detailed review of the preliminary 1950 Agricultural Census totals, upon the special request of the Bureau of the Census. Washington statisticians assisted in a preliminary inspection of some of the first States ready, and designed special forms to aid in analyzing the county results for possible irregularities or discrepancies. As soon as it became known when all the county tabulation sheets for a specific State would be ready for the final analysis before publication, arrangements were made to call in one of the State statisticians for a period of 10 days to 2 weeks, to collaborate with Census technicians in a thorough-going review and to furnish information on local conditions. A variety of pertinent check data, by counties, were prepared by the State offices and furnished to the Census Bureau in advance of the scheduled review period. The review was completed for nearly half the States by July 1, and the last States were finished by October 1. The intimate working relationship has been most satisfactory to both Bureaus. It is proving especially helpful to the Agricultural Estimates statisticians who are now engaged in the tremendous task of revising crop and livestock estimates for the intercensal years, on the basis of analysis of 1950 Census results.
4. In anticipation of the five-year revision of livestock estimates, and the intricate problem of adjusting April 1 Census results to the established January 1 date for inventory estimates, a special mail survey was made as of April 1, to measure livestock inventories as of that date, for comparison with the January 1 reports of the same producers. A similar survey was made on turkeys, to measure change in inventories on respondents' farms between January 1 and April 1. Forms and instructions were designed to facilitate uniform analysis of the matched returns and the calculation of adjustment factors to convert Census totals to equivalent January 1 numbers.
5. In the last quarter of fiscal year 1951, each State office analyzed its complete series of 1950 season average prices of truck crops produced for fresh market, to show the component prices by point and method of sale represented in the single season average. This appraisal of the average seasonal prices was essential to the determination of legal minimum prices as required by law. It was necessary that the data provide a basis for establishing these legal minimums by areas and for each of the more common methods or circumstances of sale.



6. Present estimates of truck crops for fresh market, now chiefly include the production in recognized commercial areas primarily for shipment to distant markets. The problem of including in these estimates that production which is grown for local fresh market sale has long been under study. As an outgrowth of exploratory Research and Marketing Act surveys of local market vegetable production, mainly in districts supplying the New York City market, plans have been developed whereby the scope of the truck crop estimates could be extended to include this local market production. The plans, which would provide for estimates of each important crop, would thus result in more complete coverage of crops and areas, and place the truck crop estimates on a sounder statistical basis. With the newly available 1950 Census data, it is hoped that a substantial start may be made in the direction of preparing these broader estimates this year.
7. A post-season survey of tung oil mills, initiated in June 1950, and repeated this year, provided the basis for revising estimates of the previous year's production of tung nuts, and the prices received by growers. Annual data on production and prices have heretofore been secured only through mill reports in December each year. A pilot study was conducted in Louisiana in December 1950 to secure sample information direct from growers, to supplement the mill data. Special grower surveys were made as of June 1, 1951, in the five tung nut States to provide the basis for a June forecast of production, the first ever made.
8. The timing and coordination of compilations and other operations relating to the monthly slaughter reports, which involve some action on the part of three different agencies in the Department, have been perfected to a point where the combined total slaughter report is released within a few days after the report on slaughter and meat production for plants under Federal inspection.

The beginning of slaughter control, and the Office of Price Stabilization requirement of mandatory reports from all slaughterers producing over 100,000 pounds, entailed immediate and substantial changes in the handling of individual reports to accommodate the needs of the OPS, and avoid disrupting the established scheduling for the monthly slaughter reports. Arrangements were made to secure duplicate copies of mandatory reports, and to continue sampling all other non-Federally inspected slaughterers (under 100,000 pounds) on a voluntary basis. While the system is more complex from the sampling and estimating standpoint, it does minimize the burden upon firms required to report under the control program. All field offices have assisted district OPS offices continuously in resolving questions pertaining to lists and the reports of slaughterers under quota controls.



9. A report was issued on Milk Production on Farms, and Statistics of Dairy Plant Products, 1950, which included additional special summary tables on milk production per cow, percentage of milk cows milked, and relationships between numbers of young milk stock kept for replacement purposes to numbers of milk cows and heifers two years old and over on farms January 1. In the manufactured dairy products table, production and manufacturers' selling prices of bulk condensed milk were included for the first time and tables on other evaporated and dry products were enlarged to show data for the last three years instead of only two.

Comparison of Certain Work-Load Data  
Agricultural Estimates (Including Cooperative Work)  
Fiscal Years 1950 and 1951 with Estimates for 1952 and 1953

	Fiscal year 1950	Fiscal year 1951	Fiscal year 1952	Fiscal year 1953
Separate inquiries mailed to farmers and others	11,340	11,200	11,300	11,300
Copies of schedules distributed	8,949,400	8,600,000	8,800,000	8,800,000
Schedules tabulated	2,266,600	2,400,000	2,700,000	2,700,000
Questions per schedule (average)	19.8	20.0	20.0	20.0
Reports prepared and released	5,970	6,200	6,300	6,500
Copies of reports distributed	9,703,100	10,000,000	10,200,000	10,200,000
Printed releases distributed	2,609,400	2,700,000	2,800,000	2,800,000
Special inquiries answered: by mail	31,320	32,000	33,000	33,000
by telephone and telegraph	36,980	37,500	38,000	38,000
Personal interviews (exclusive of enumerations)	16,730	17,200	18,000	18,000
Special county estimates prepared	178,800	182,000	200,000	200,000
Miles of travel within State	1,164,800	1,100,000	1,200,000	1,200,000

	January	February	March	April	May	June	July	August	September	October	November	December	
1	--- Hol. ---		Mobair Prod. and Income; Evap. Cond. & Dried Milk; Dried Casein	--- Sun. ---			--- Sun. ---		--- Sat. ---	Evap. Cond. & Dried Milk; Dried Casein	Sunflower	--- Sat. ---	1
2		Meat Scraps & Tankage	Shipment of Package Bees	Interstate Movement of Dairy Cattle		--- Sat. ---	Non-Citrus Prod. & Util.; Evap. Cond. & Dried Milk; Dried Casein		--- Sun. ---		Meat Scraps & Tankage	--- Sun. ---	2
3		--- Sat. ---	--- Sat. ---	Pure Prod. & Income from Chickens & Eggs; Cattle, Broiler Prod.	Meat Scraps & Tankage	--- Sun. ---		Meat Scraps & Tankage	--- Hol. ---		--- Sat. ---		3
4		--- Sun. ---	--- Sun. ---		Disp. & Sales of Principal Field Crops		--- Hol. ---	--- Sat. ---		Red Clover	--- Sun. ---		4
5	Truck Crop News			Truck Crop News	--- Sat. ---	Truck Crop News		--- Sun. ---	Mustard	Truck Crop News			5
6	--- Sat. ---	Truck Crop News	Truck Crop News		--- Sun. ---		Ky. Bluegrass; Truck Crop News	No. of Milk Cows on Farms, June		--- Sat. ---	Truck Crop News	Truck Crop News	6
7	--- Sun. ---			--- Sat. ---	Truck Crop News		--- Sat. ---	Truck Crop News; Prod. of Shorn Wool	Truck Crop News	--- Sun. ---			7
8			Early Lamb Crop	--- Sun. ---	Cotton Revisions		--- Sun. ---	Cotton	--- Sat. ---	Cotton	Cotton	--- Sat. ---	8
9	General; Truck Crops for Fresh Market; Farm Labor	General; Truck Crops for Fresh Market; Farm Labor	General; Truck Crops for Fresh Market; Farm Labor	--- Sat. ---	--- Sat. ---	--- Sat. ---	Cotton	Stocks 34 Field Seeds, June 30	--- Sun. ---		General; Truck Crops for Fresh Market & Processing; Farm Labor	--- Sun. ---	9
10	General; Truck Crops for Fresh Market and Processing	--- Sat. ---	--- Sat. ---	General; Truck Crops for Fresh Market & Processing; Farm Labor	General; Truck Crops for Fresh Market & Processing; Farm Labor	--- Sun. ---	General; Truck Crops for Fresh Market & Processing; Farm Labor	General; Truck Crops for Fresh Market & Processing; Farm Labor	Cotton	General; Truck Crops for Fresh Market & Processing; Farm Labor; Cattle Feeding Sit.	--- Sat. ---	Cotton	10
11	Sheep & Lambs on Feed	--- Sun. ---	--- Sun. ---	Development of Early Lamb Crop	Intended Agr. & Prod. 50 Veg.; Early Lamb Crop	General; Truck Crops for Fresh Market & Processing; Farm Labor		--- Sat. ---	General; Truck Crops for Fresh Market & Processing; Farm Labor	Lamb Feeding Situation	--- Sun. ---	General; Truck Crops for Fresh Market; Farm Labor; Cattle Feeding Sit.	11
12	Acres & Prod. of 50 Veg.; Farm Disp. & Sales of Fruit & Nut Crops; Farm Labor				--- Sat. ---		Hybrid Corn	--- Sun. ---		Citrus Prod. & Util.; Alfalfa Prod.; Estimates of 1950 Honey Prod.	--- Hol. ---	Lamb Feeding Situation	12
13	--- Sat. ---		Young Chickens & Potential Layers on Farms		--- Sun. ---		Orchard Crops		Sweetclover	--- Sat. ---			13
14	--- Sun. ---	Potato Stocks; Quarterly Naval Stores	Potato Stocks	--- Sat. ---			--- Sat. ---	Apple Production by Varieties	Bermudagrass, Bromegrass & Wheatgrasses	--- Sun. ---	Cattle Feeding Situation	Hatchery; Fluid Milk & Cream	14
15	Hatchery	Livestock & Hatchery on Farms; Hatchery; Milk Prod. on Farms & Stat. of Dairy Plant Prod.	Hatchery; Revisions; Monthly Hatchery	--- Sun. ---	Hatchery; Quarterly Naval Stores	Hatchery	--- Sun. ---	Hatchery; Quarterly Naval Stores	--- Sat. ---	Hatchery	Quarterly Naval Stores; Lamb Feeding Sit.	--- Sat. ---	15
16	Fluid Milk & Cream	Fluid Milk & Cream	Fluid Milk & Cream	Hatchery; Farm Prod., Disp. & Income from Milk; Fluid Milk & Cream	Fluid Milk & Cream	--- Sat. ---	Hatchery; Fluid Milk & Cream	Stocks 50 Veg. Seeds June 30; Fluid Milk and Cream	--- Sun. ---	Fluid Milk & Cream	Hatchery; Fluid Milk & Cream	--- Sun. ---	16
17	--- Sat. ---	--- Sat. ---	--- Sat. ---			--- Sun. ---		Bentgrass & Fescue	Hatchery; Fluid Milk & Cream	Sudan Grass	--- Sat. ---	Annual Summary; Season Average Prices; Truck Crops for Fresh Market & Prod.	17
18	Cattle on Feed; Cabbage Stocks; Onion Stocks	--- Sun. ---	--- Sun. ---	Cattle on Feed	Fluid Milk & Cream	Cattle on Feed; Mustard Seed	--- Sat. ---				--- Sun. ---		18
19	Truck Crop News; Potato Stocks		Prospective Plantings	--- Sat. ---			--- Sun. ---			Truck Crop News		Seeding of 1952 W. Wheat & Rye; Apple Prod. by Varieties	19
20	--- Sat. ---	Truck Crop News; Naval Stores	Truck Crop News; Naval Stores	Truck Crop News; Processing; Naval Stores	--- Sun. ---	Naval Stores	Truck Crop News; Processing; Naval Stores	Naval Stores	Truck Crop News; Naval Stores	--- Sat. ---	Truck Crop News; Naval Stores	Full Pig Crop; Truck Crop News; Naval Stores	20
21	--- Sun. ---			--- Sat. ---	Naval Stores	Spring Pig Crop; Cinnamon Clover; White Clover; Truck Crop News; Sour Cherries	--- Sat. ---	Cranberries; Truck Crop News; Turkey Prod.		--- Sun. ---			21
22	Turkey Prod. Evap. & Cond. Milk Wholesale Grocers' Stocks; Naval Stores	--- Hol. ---		--- Sun. ---	Truck Crops for Processing; Truck Crop News	Truck Crops for Processing; Peanut Stocks & Processing	--- Sun. ---		--- Sat. ---	Evap. & Cond. Milk Wholesale Grocers' Stocks; Naval Stores	--- Hol. ---	--- Sat. ---	22
23		Peanut Stocks & Processing	Hops Stocks; Peanut Stocks & Processing	Evap. & Cond. Milk Wholesale Grocers' Stocks	--- Sat. ---	Evap. & Cond. Milk Wholesale Grocers' Stocks	Evap. & Cond. Milk Wholesale Grocers' Stocks	Hat Crops Prod. & Util.; Alsike Clover; Timothy	--- Sun. ---		Lespedeza; Peanut Stocks & Processing	--- Sun. ---	23
24	Peanut Stocks & Processing	--- Sat. ---	--- Sat. ---	Peanut Stocks & Processing	Peanut Stocks & Processing	--- Sun. ---	Peanut Stocks & Processing	Peanut Stocks & Processing	Hop Stocks; Peanut Stocks & Processing	Peanut Stocks & Processing	--- Sat. ---	Peanut Stocks & Processing	24
25	Wheat Stocks; Grain Stocks; Liquid & Dried Egg Prod.; Canned & Evis. Poultry	--- Sun. ---	--- Sun. ---	Wheat Stocks; Grain Stocks; Liquid & Dried Egg Prod.; Canned & Evis. Poultry	Liquid & Dried Egg Prod.; Canned & Evis. Poultry	Liquid & Dried Egg Prod.; Canned & Evis. Poultry	Wheat Stocks; Liquid & Dried Egg Prod.; Canned & Evis. Poultry; Grain Stocks	--- Sat. ---	Liquid & Dried Egg Prod.; Canned & Evis. Poultry	Wheat Stocks; Grain Stocks; Liquid & Dried Egg Prod.; Canned & Evis. Poultry	--- Sun. ---	--- Hol. ---	25
26	Prod. & Value of Honey; Rations Fed to Milk Cows	Liquid & Dried Egg Prod.; Canned & Evis. Poultry	Prod. & Value of Honey; Rations Fed to Milk Cows; Liquid & Dried Egg Prod.; Canned & Evis. Poultry	Prod. & Value of Honey; Rations Fed to Milk Cows; Liquid & Dried Egg Prod.; Canned & Evis. Poultry	--- Sat. ---		Redtop	--- Sun. ---			Liquid & Dried Egg Prod.; Canned & Evis. Poultry	Liquid & Dried Egg Prod.; Canned & Evis. Poultry	26
27	--- Sat. ---	Monthly Egg Prod.; Wool Prod. & Income		Prices	--- Sun. ---		Prices; Chickens Raised, Prelim. Est.	Liquid & Dried Egg Prod.; Canned & Evis. Poultry	--- Sat. ---				27
28	--- Sun. ---	Prices; Livestock Slaughter		--- Sat. ---		Lupine; Winter Cover Crops	--- Sat. ---		Prices; Livestock Slaughter	--- Sun. ---			28
29	Soybean & Flaxseed Stocks			--- Sun. ---	Prices	Prices; Livestock Slaughter	--- Sun. ---	Prices; Ladino Clover; White Clover	--- Sat. ---	Soybean & Flaxseed Stocks		--- Sat. ---	29
30	Prices; Evap. Cond. & Dried Milk; Dried Casein		Prices; Livestock Slaughter; Evap. Cond. & Dried Milk; Dried Casein	Soybean & Flaxseed Stocks; Livestock Slaughter; Evap. Cond. & Dried Milk; Dried Casein	--- Hol. ---	--- Sat. ---	Soybean & Flaxseed Stocks; Livestock Slaughter; Evap. Cond. & Dried Milk; Dried Casein	Winter Cover Crops; Livestock Slaughter; Evap. Cond. & Dried Milk; Dried Casein	--- Sun. ---	Prices; Livestock Slaughter; Evap. Cond. & Dried Milk; Dried Casein	Prices; Livestock Slaughter; Evap. Cond. & Dried Milk; Dried Casein	--- Sun. ---	30
31	Livestock Slaughter		--- Sat. ---		Livestock Slaughter; Evap. Cond. & Dried Milk; Dried Casein		U.S. Lamb Crop; Livestock Slaughter					Prices; Certified Seed Potatoes; Livestock Slaughter; Evap. Cond. & Dried Milk; Dried Casein	31

□ Lock-up reports

--- Sat. --- □ Saturday

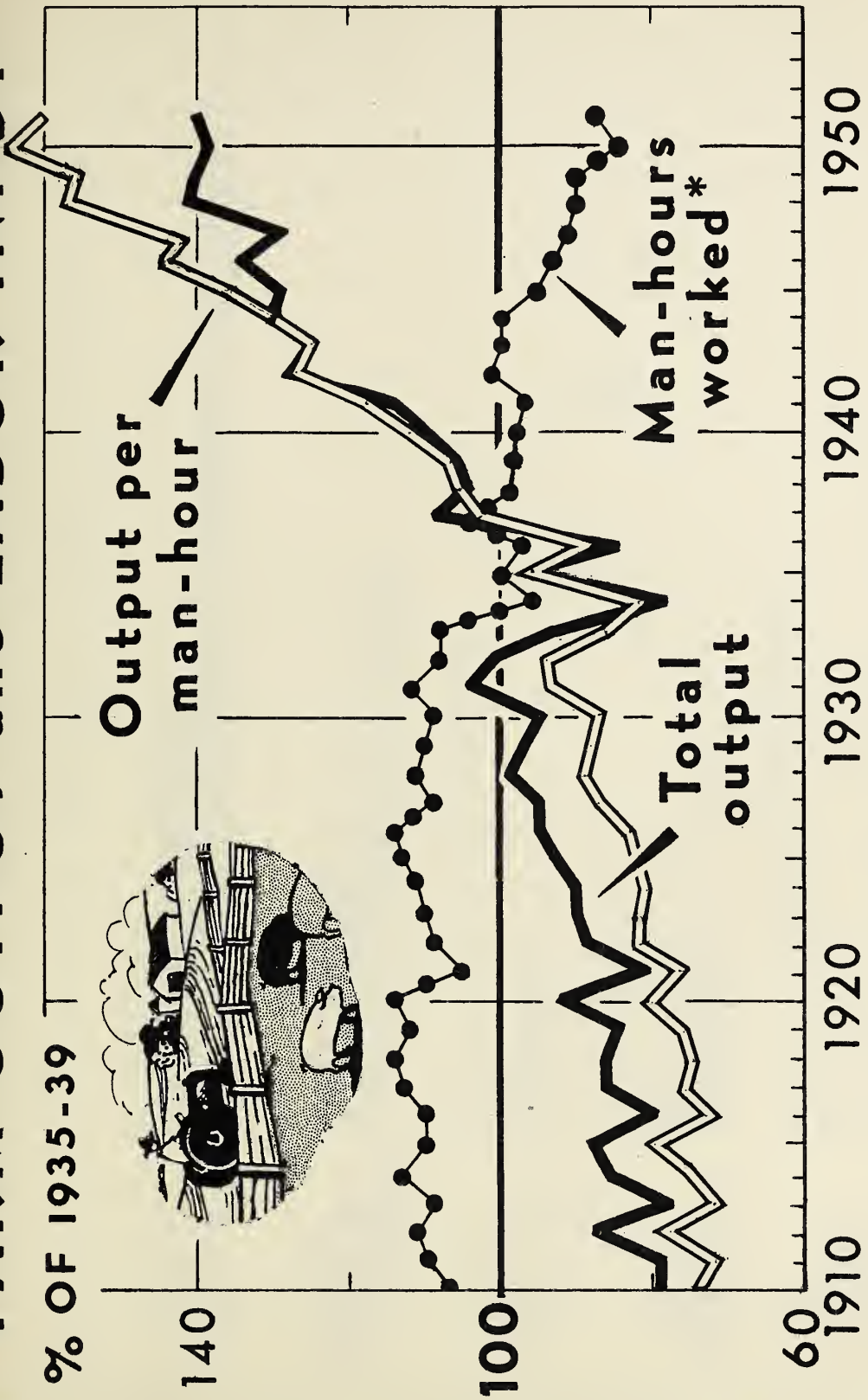
--- Sun. --- □ Sunday

--- Hol. --- □ Holiday



Commission of Captain Work-I and Data

# FARM OUTPUT and LABOR INPUT



\* IN TERMS OF TIME USED BY ADULT MALES

Figure 1





# PRINCIPAL MACHINES ON FARMS

## Now and Before Pearl Harbor

### TRACTORS



### TRUCKS



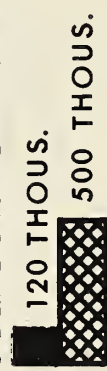
### MILKING MACHINES



### COMBINES



### MECH. CORN PICKERS



1941  
1951



# NET FARM INCOME, COMMERCIAL FAMILY-OPERATED FARMS, BY TYPE

*Dairy, Cotton, and Wheat Farms*

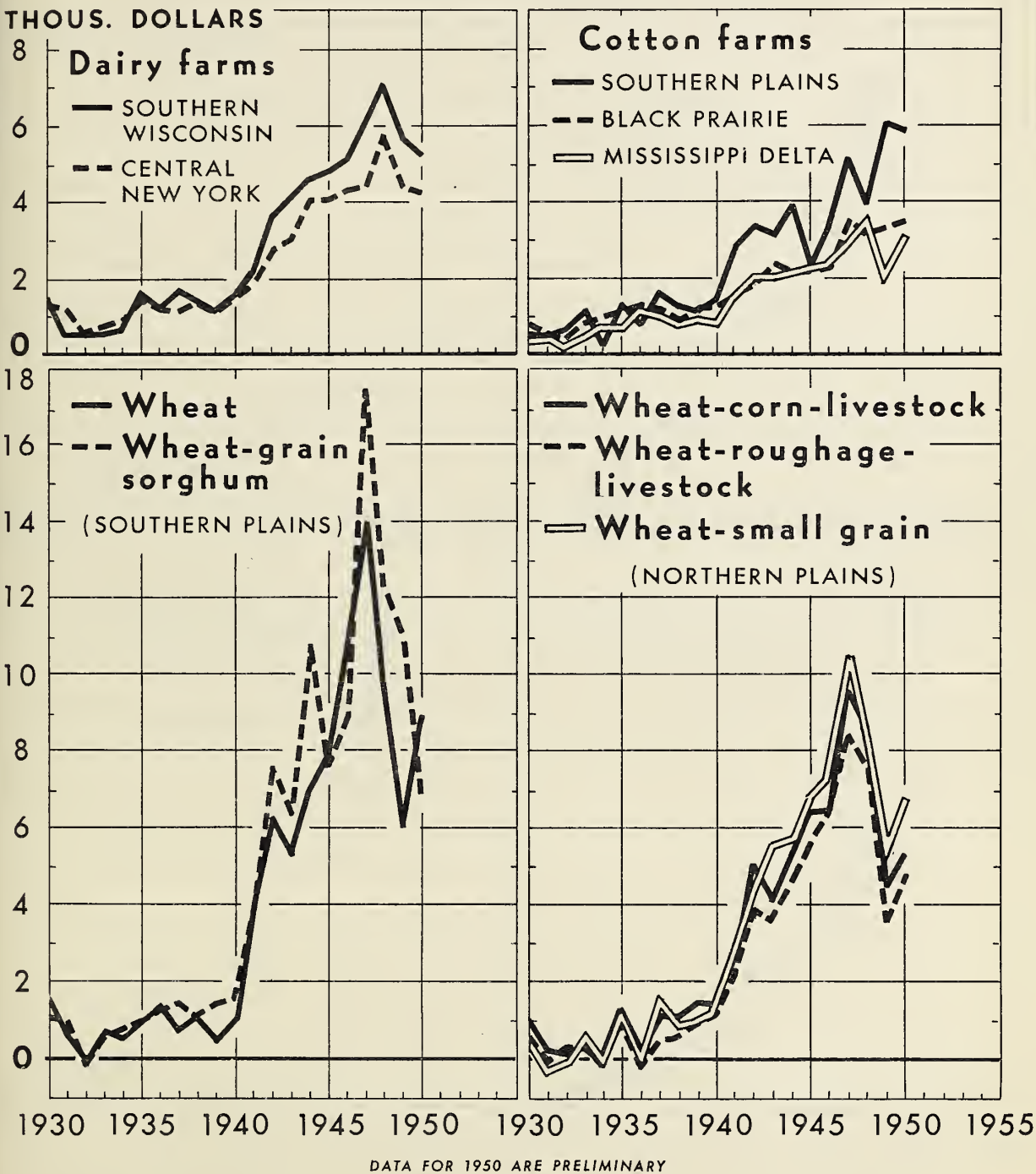


FIGURE 3

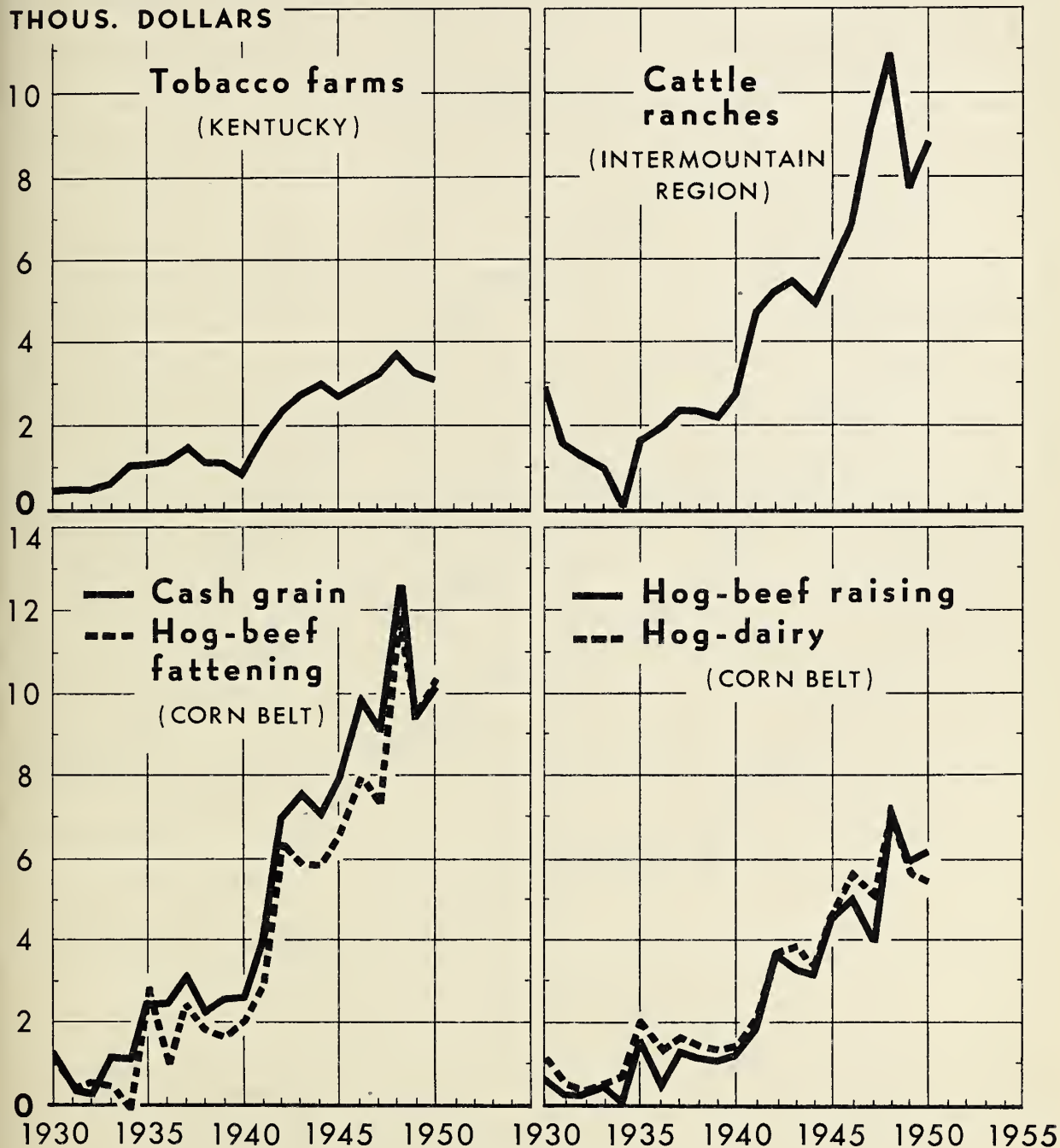




# NET FARM INCOME, COMMERCIAL FAMILY-OPERATED FARMS, BY TYPE

*Tobacco and Corn Belt Farms, and Cattle Ranches*

THOUS. DOLLARS



DATA FOR 1950 ARE PRELIMINARY

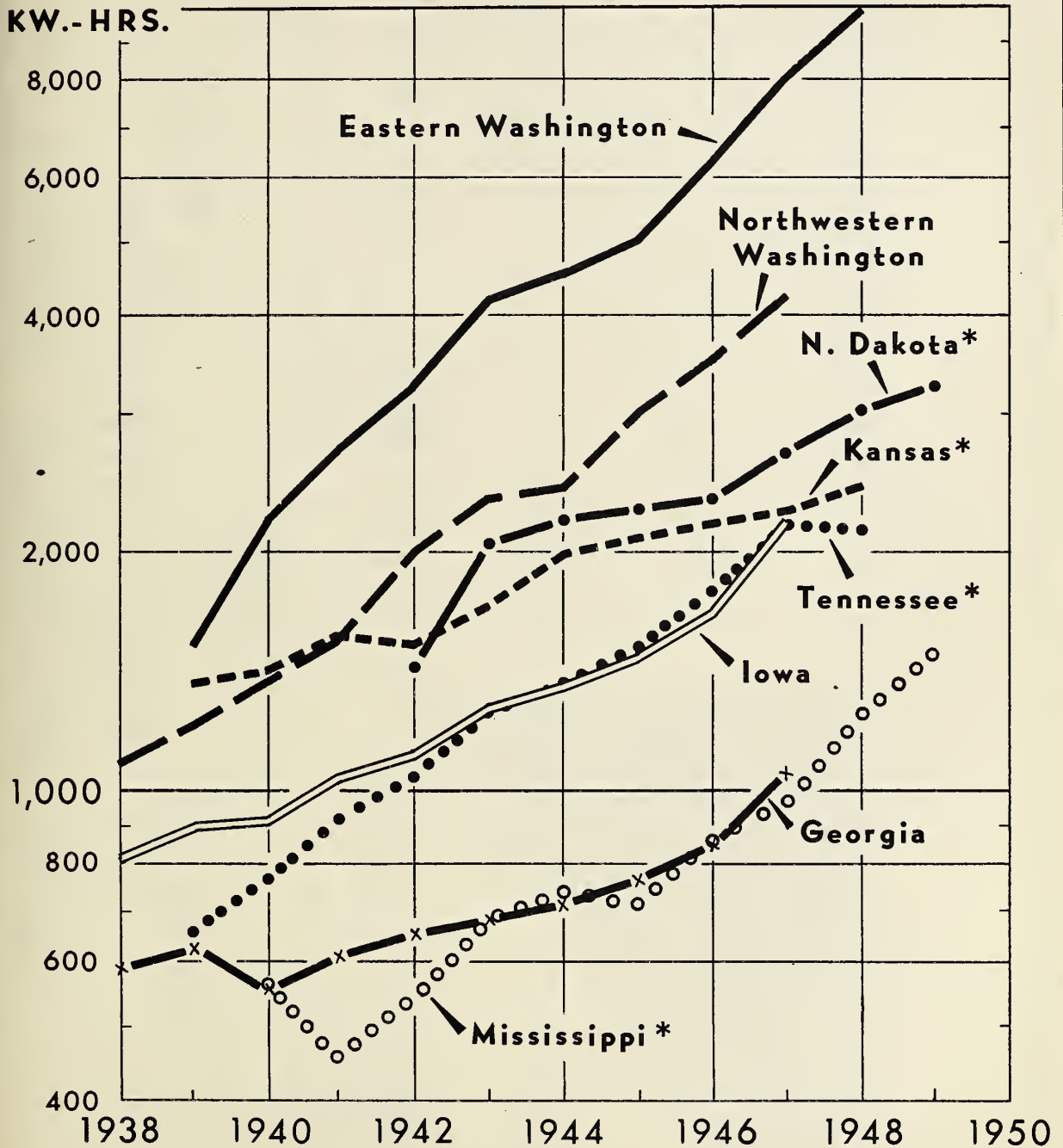
FIGURE 4





# CONSUMPTION OF ELECTRICITY PER FARM

*By Designated Study Areas and Years*



U. S. DEPARTMENT OF AGRICULTURE

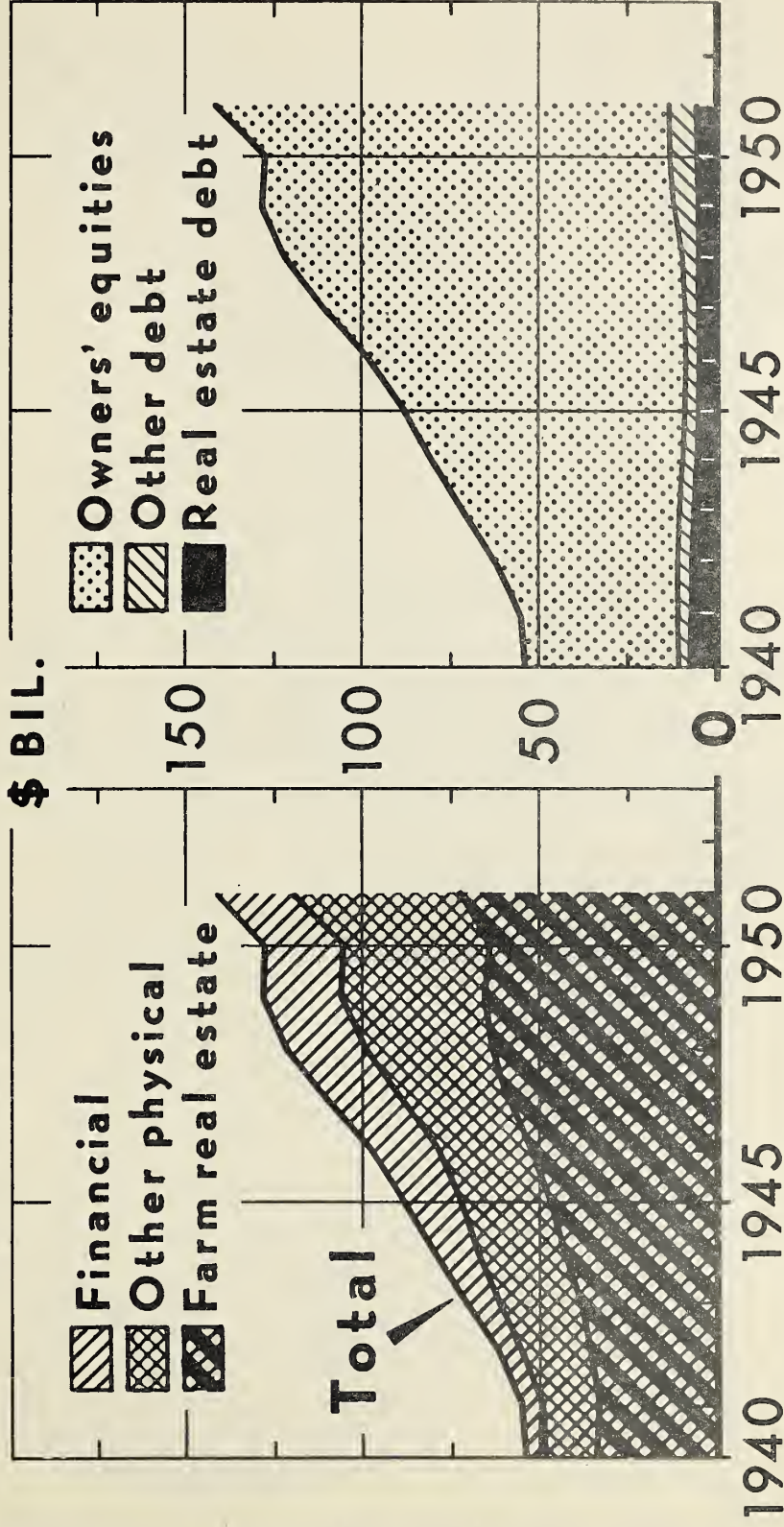
NEG. 48110-VX BUREAU OF AGRICULTURAL ECONOMICS

Figure 5



# THE BALANCE SHEET OF AGRICULTURE

## ASSETS CLAIMS



DATA ARE AS OF JANUARY 1 EACH YEAR

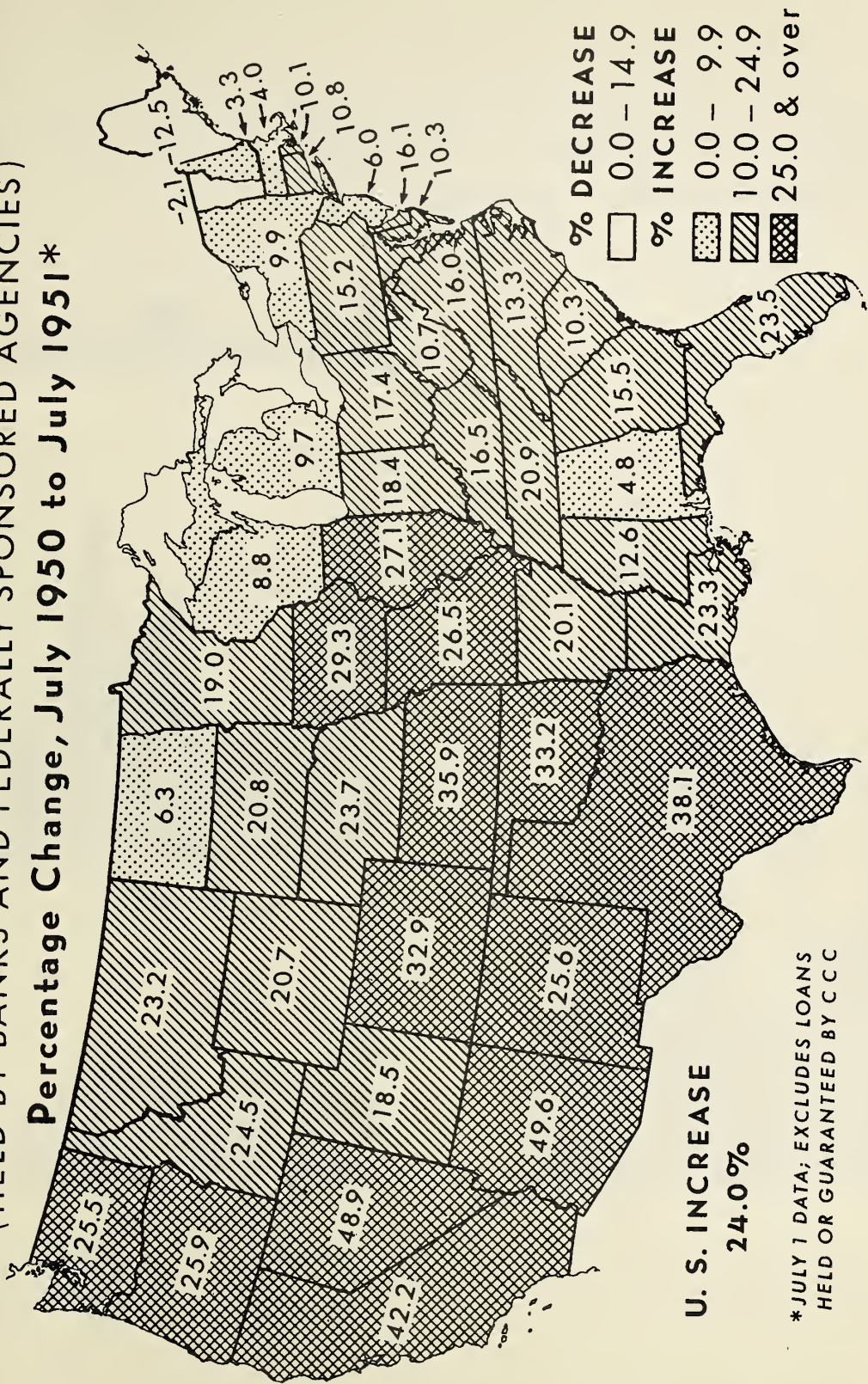




# NON-REAL-ESTATE FARM LOANS

(HELD BY BANKS AND FEDERALLY SPONSORED AGENCIES)

Percentage Change, July 1950 to July 1951\*



\* JULY 1 DATA; EXCLUDES LOANS  
HELD OR GUARANTEED BY CCC

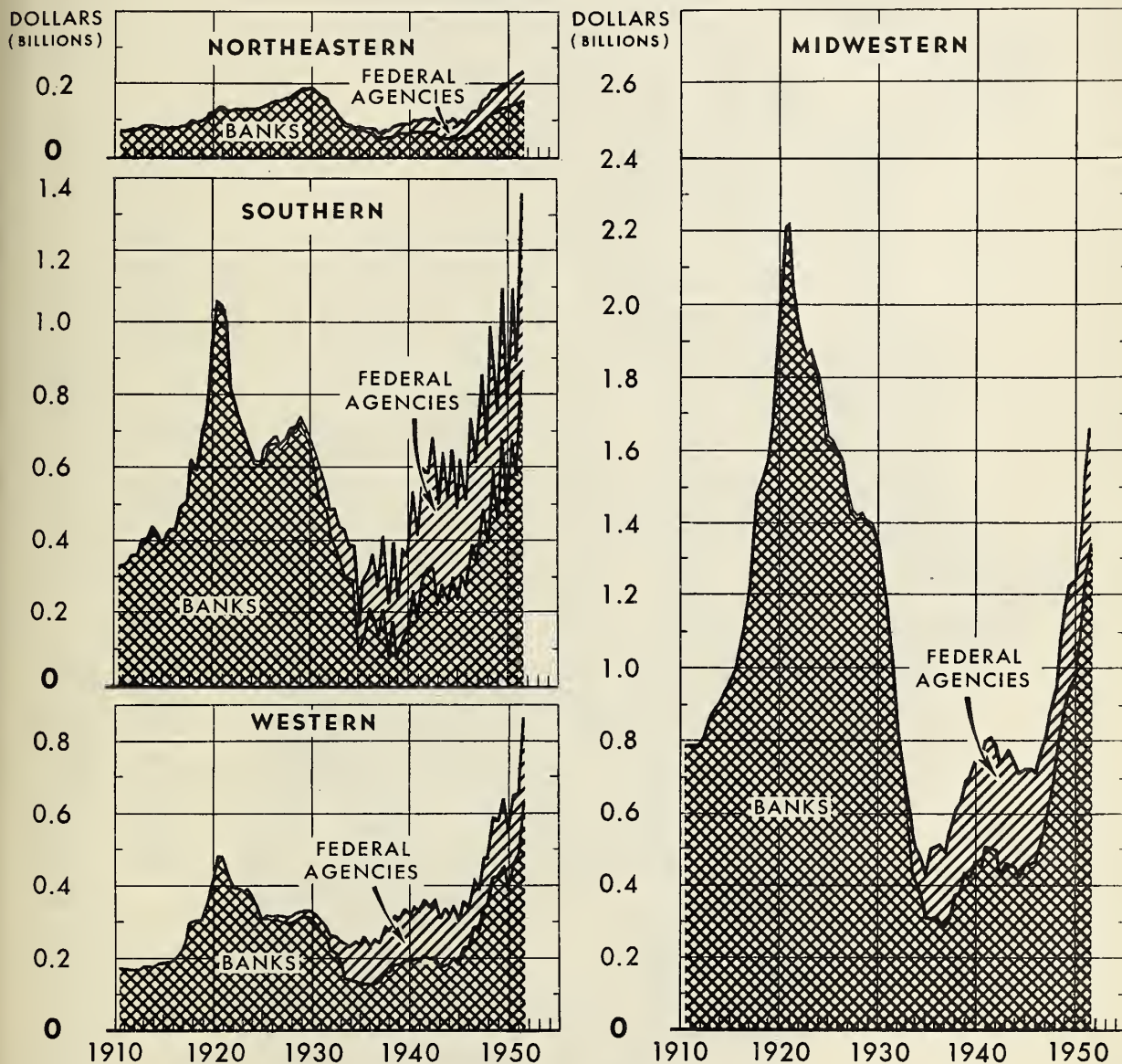
FIGURE 7





# NON-REAL-ESTATE FARM LOANS

HELD BY BANKS AND FEDERALLY SPONSORED AGENCIES, BY REGIONS\*



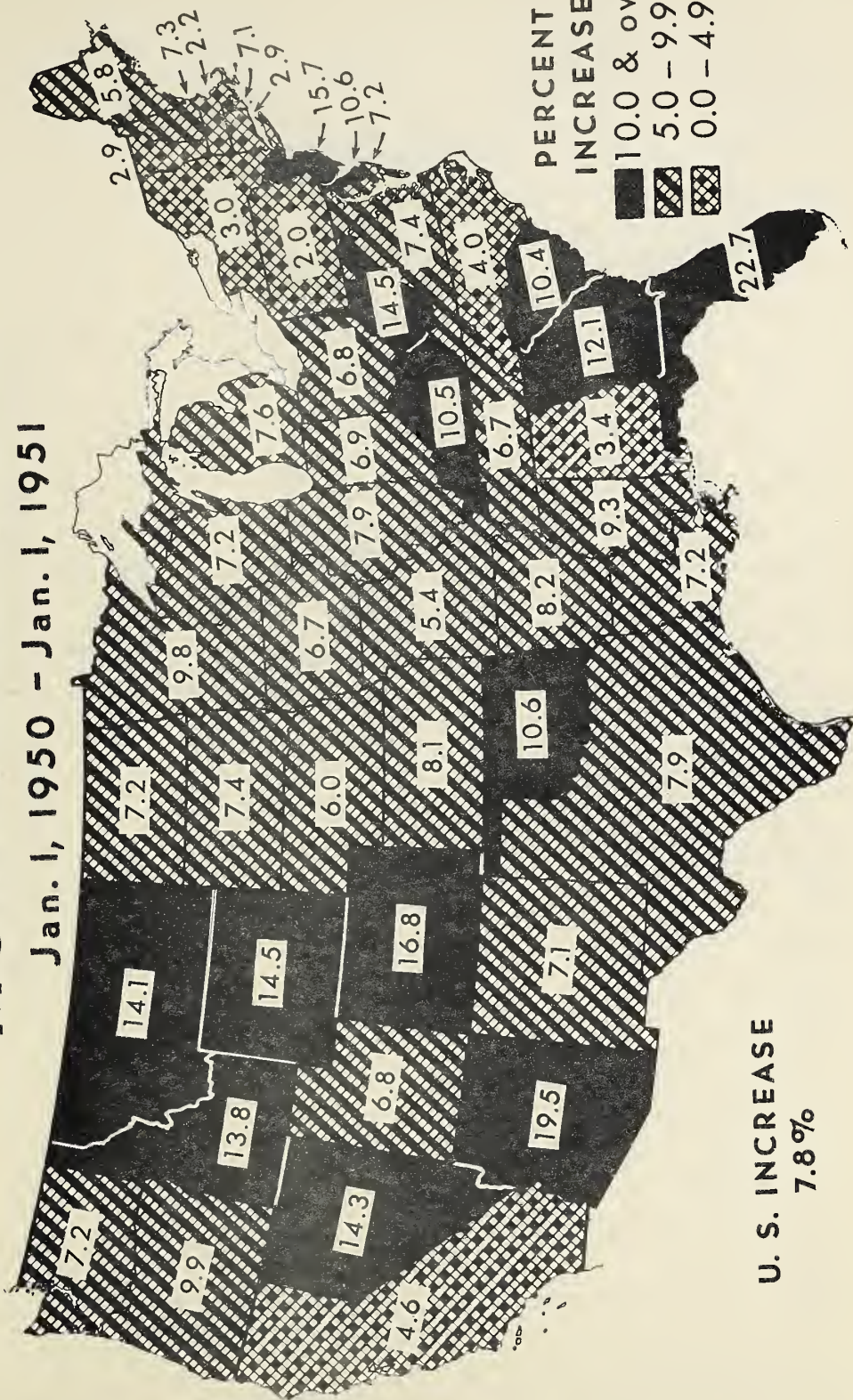
\*ALL STATE AND NATIONAL BANKS PRIOR TO 1935; INSURED COMMERCIAL BANKS 1935 AND THEREAFTER  
JAN. 1 AND JULY 1 DATA; EXCLUDING LOANS HELD OR GUARANTEED BY COMMODITY CREDIT CORPORATION

FIGURE 8



# PERCENTAGE CHANGE IN FARM- MORTGAGE DEBT

Jan. 1, 1950 - Jan. 1, 1951

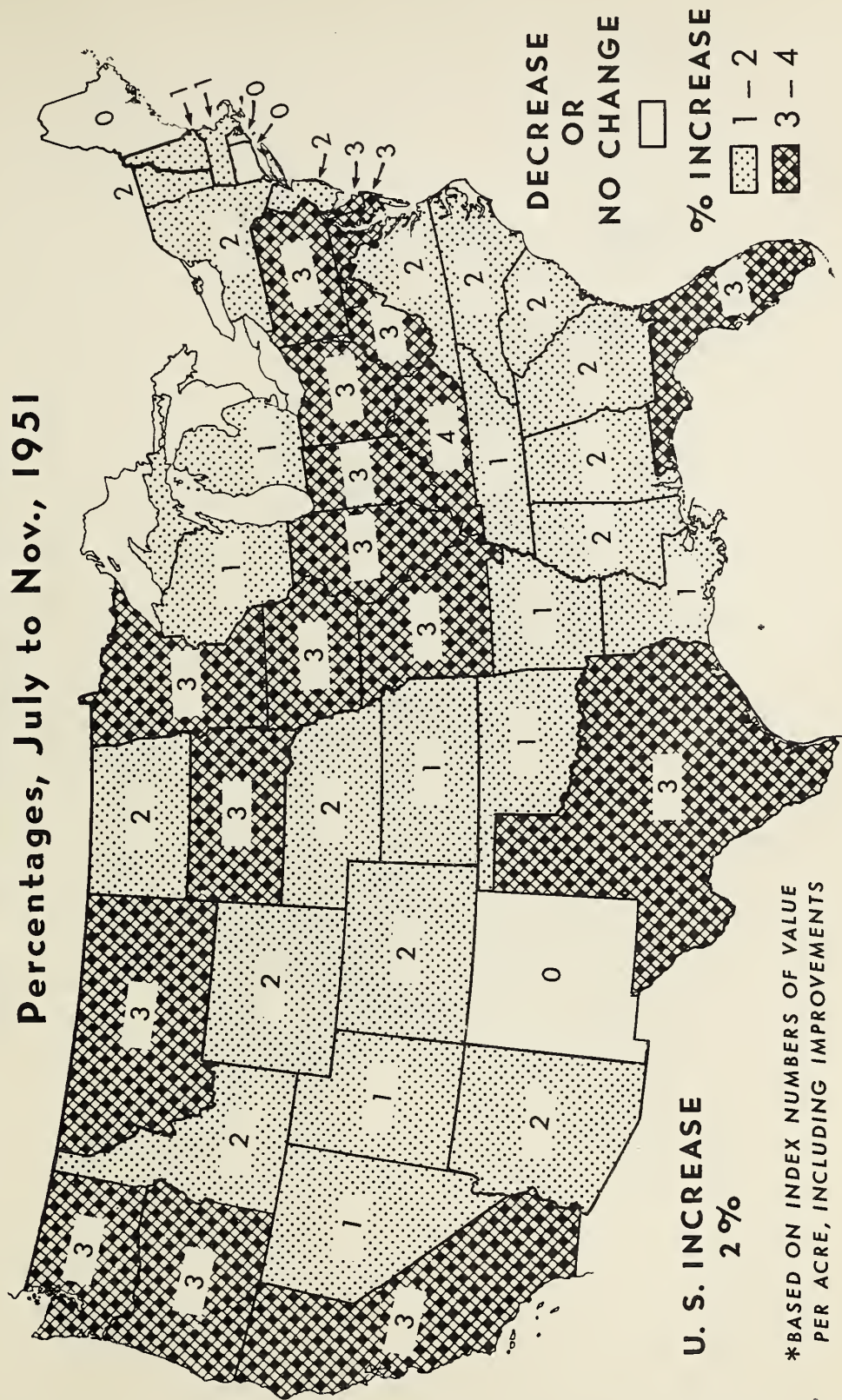






# CHANGES IN DOLLAR VALUE OF FARM LAND\*

Percentages, July to Nov., 1951



\*BASED ON INDEX NUMBERS OF VALUE  
PER ACRE, INCLUDING IMPROVEMENTS

U. S. DEPARTMENT OF AGRICULTURE

NEG. 48374-XX BUREAU OF AGRICULTURAL ECONOMICS

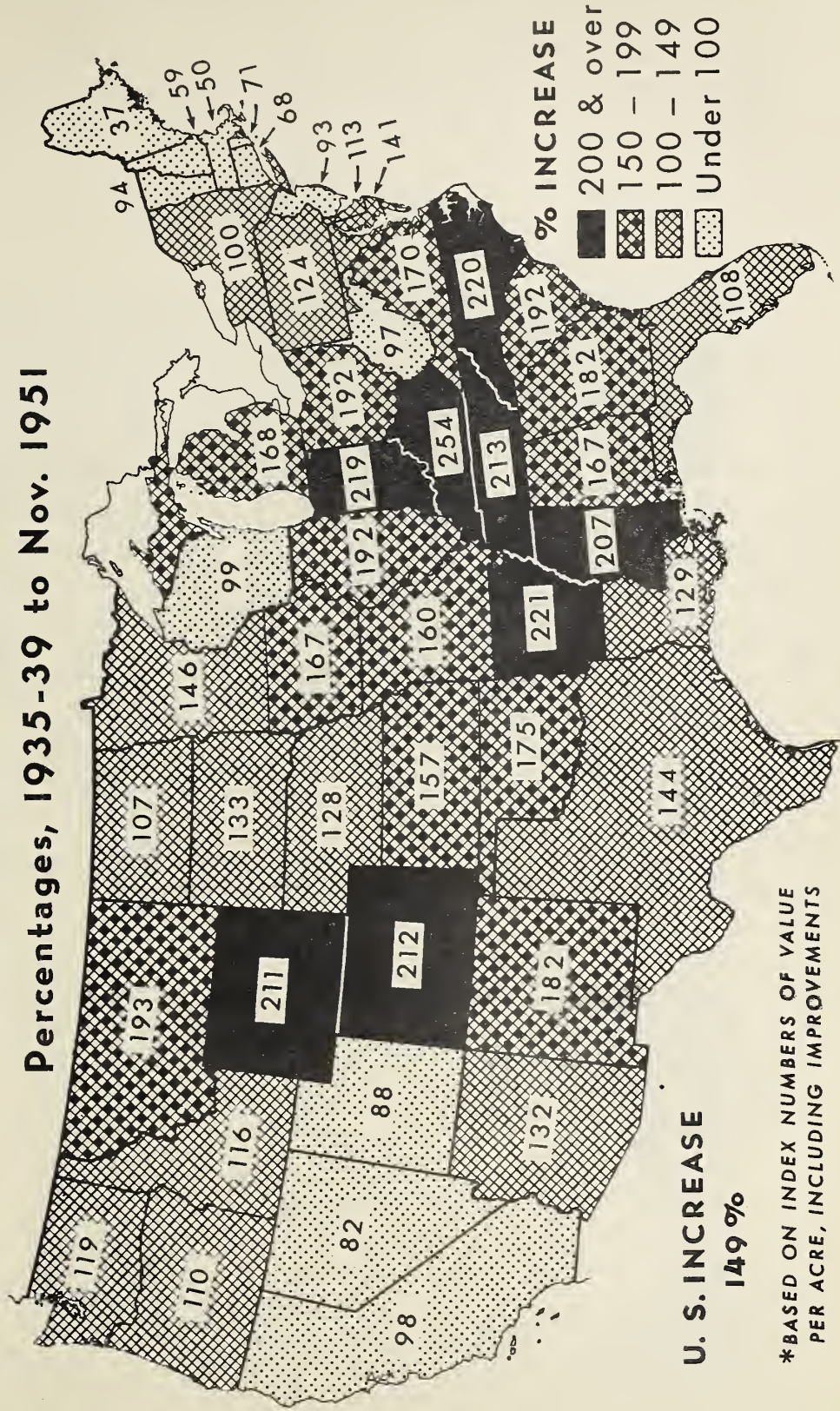
FIGURE 10





# INCREASE IN DOLLAR VALUE OF FARM LAND\*

Percentages, 1935-39 to Nov. 1951



\*BASED ON INDEX NUMBERS OF VALUE  
PER ACRE, INCLUDING IMPROVEMENTS

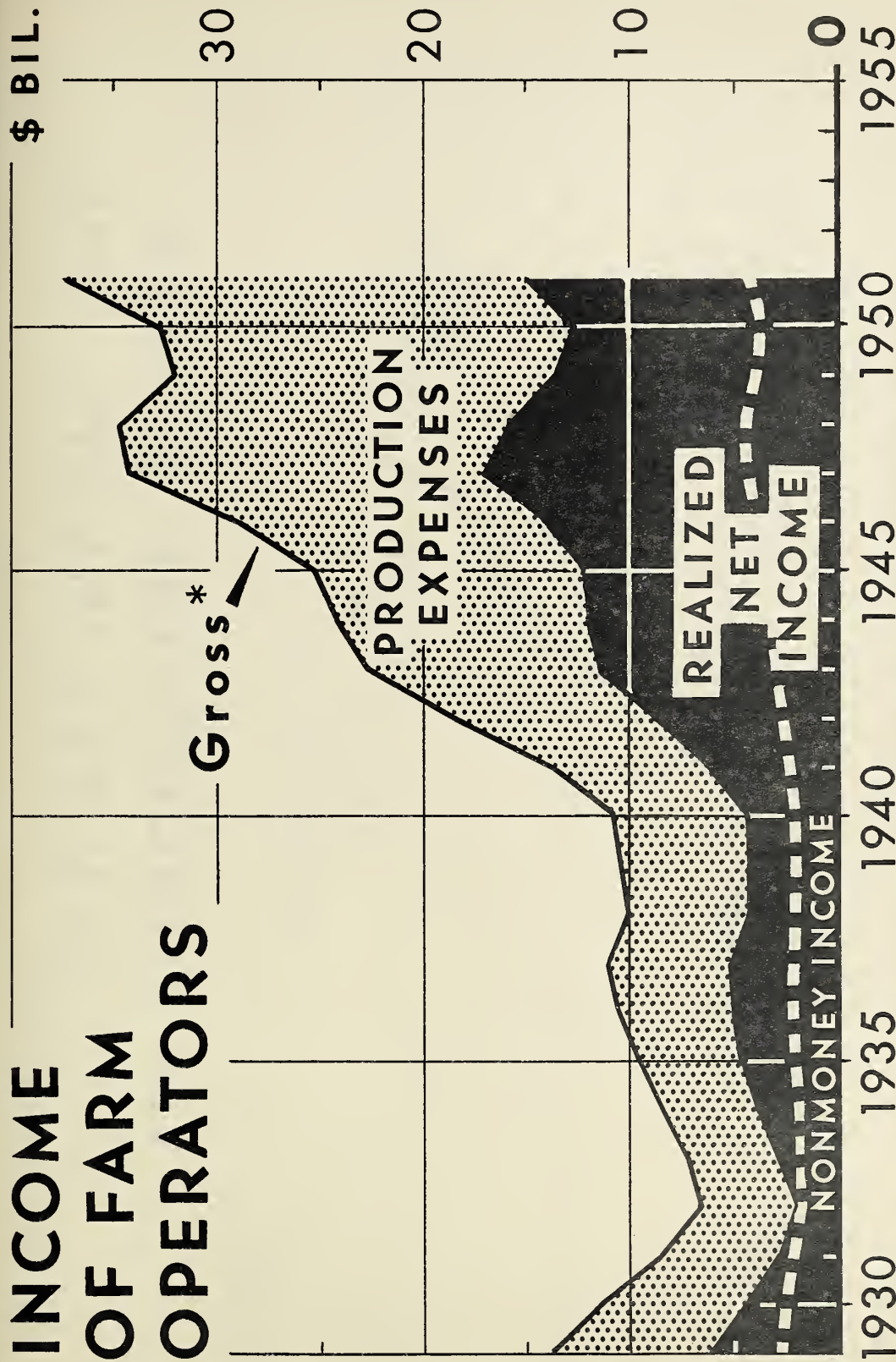
U. S. DEPARTMENT OF AGRICULTURE

NEG. 48376-XX BUREAU OF AGRICULTURAL ECONOMICS

FIGURE II



# INCOME OF FARM OPERATORS



\*INCLUDING GOVERNMENT PAYMENTS, BEGINNING 1933

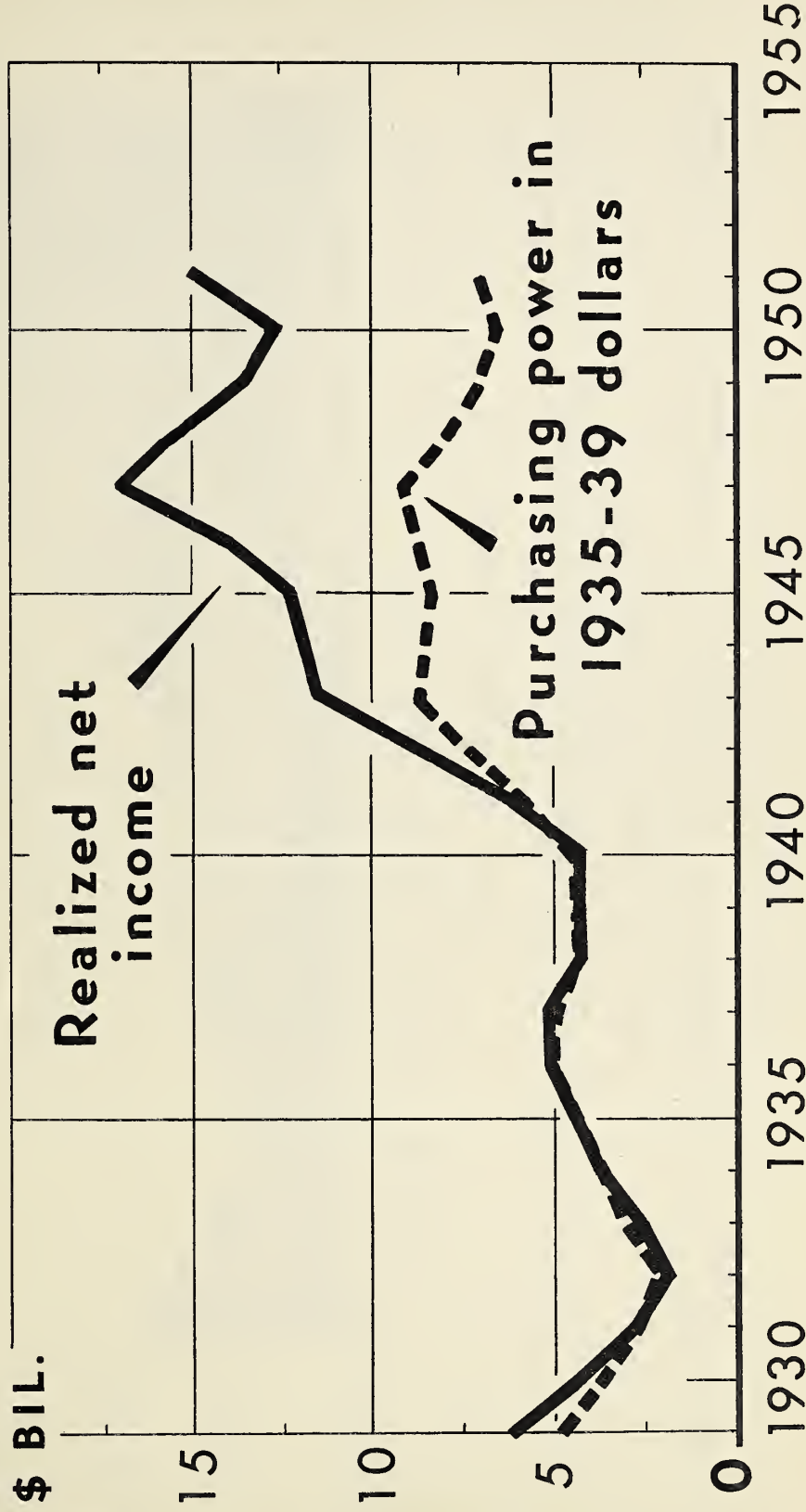
Figure 12





Farm Operators'

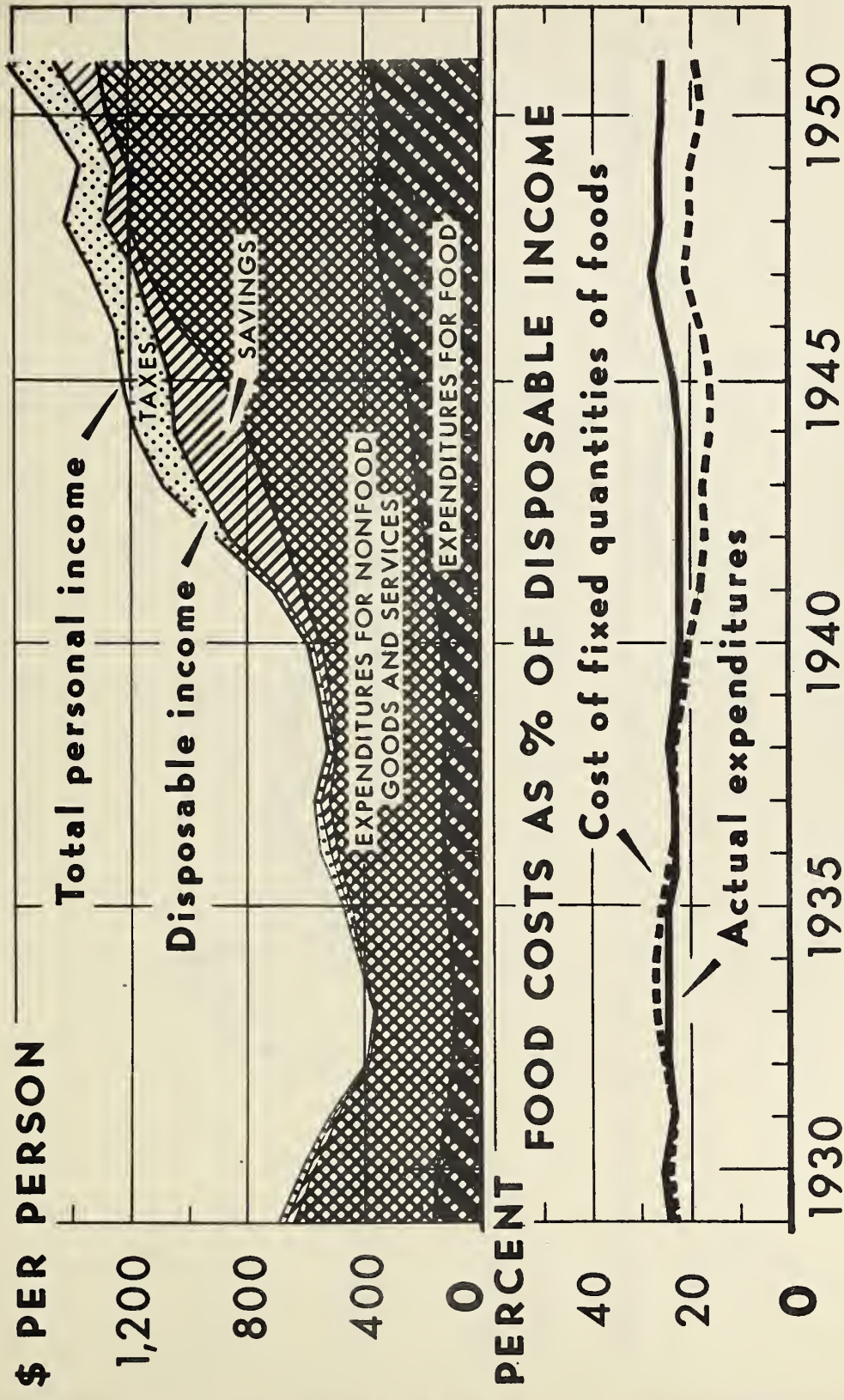
# REALIZED NET INCOME AND ITS PURCHASING POWER







# FOOD COSTS & CONSUMER INCOMES

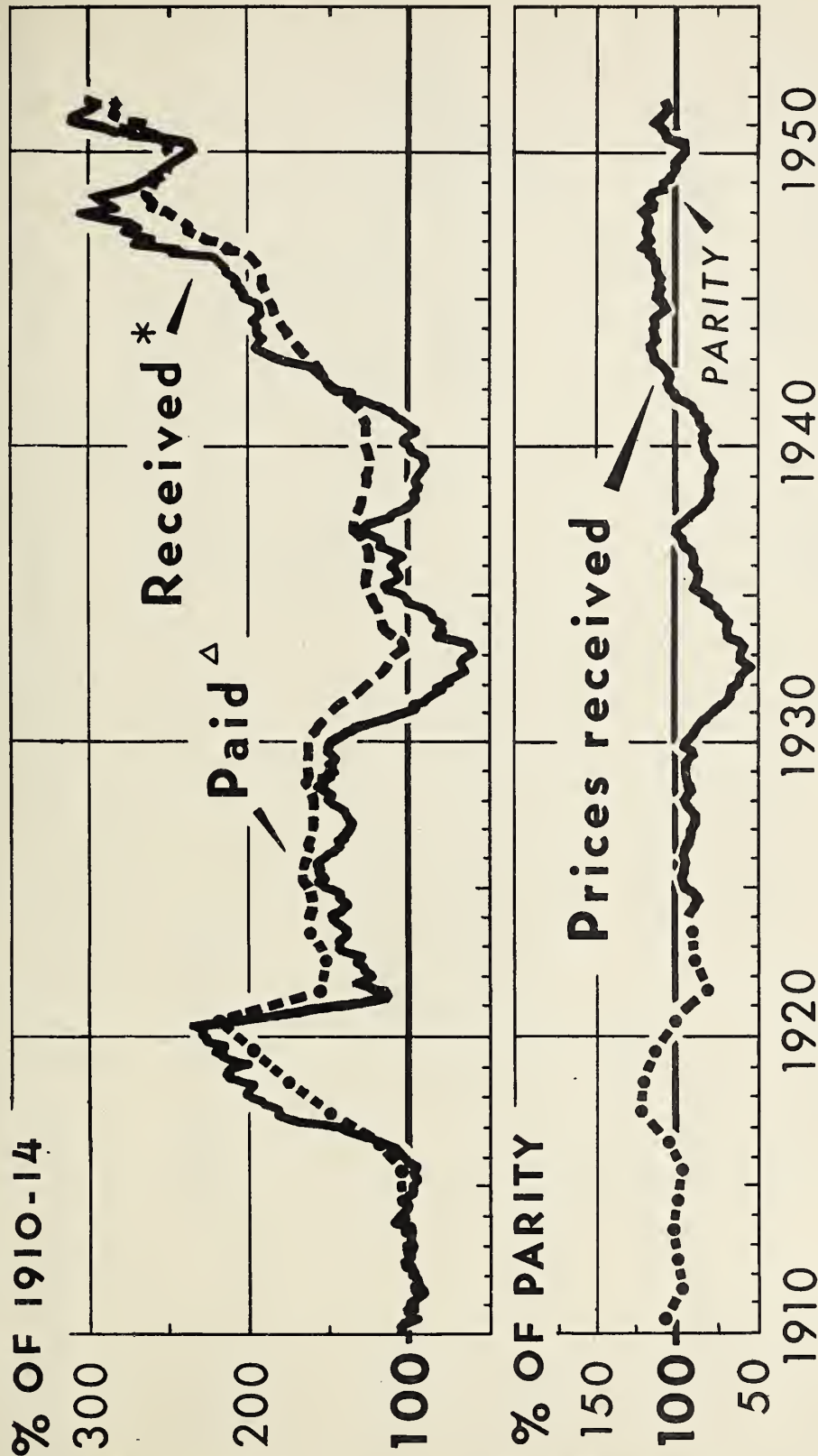


ANNUAL RATE FOR 2D QUARTER OF 1951

Figure 14



# FARMERS' PRICES (Revised Indexes)



\* MONTHLY DATA

Δ INCLUDES INTEREST, TAXES, AND WAGE RATES. ANNUAL AV. DATA, 1910-23;  
 BY QUARTERS, 1924-36, BY MONTHS, 1937 TO DATE

FIGURE 15





# WHAT WE EAT

NOW COMPARED WITH  
PRE-WORLD WAR II

## MORE PER PERSON:

MEAT,  
POULTRY,  
GAME & FISH



EXCLUDING FAT PORK PRODUCTS

EGGS .....



DAIRY  
PRODS. ....



MILK EQUIVALENT IN TERMS OF PROTEIN AND MINERAL CONTENT

FRUIT &  
VEG. ....



FATS  
& OILS .....



INCLUDING FAT CUTS AND BUTTER

COFFEE, TEA  
& COCOA



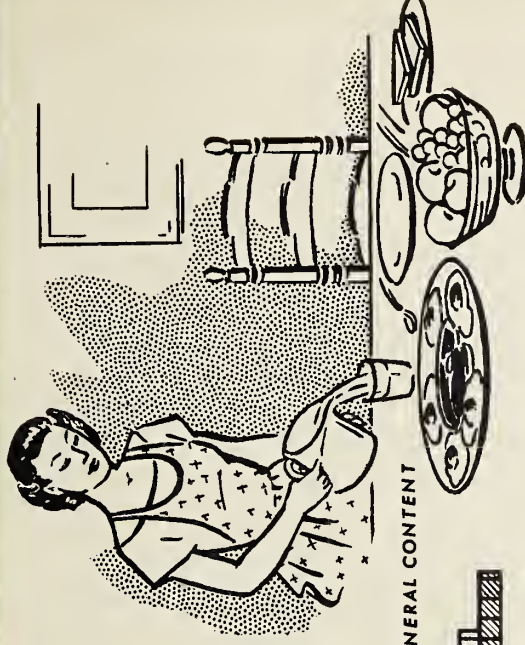
SUGARS &  
SIRUPS



DRY BEANS,  
PEAS & NUTS



Each segment equals 15 lbs. (qts. for dairy) per capita per year



## LESS:

POTATOES  
& SW. POT.

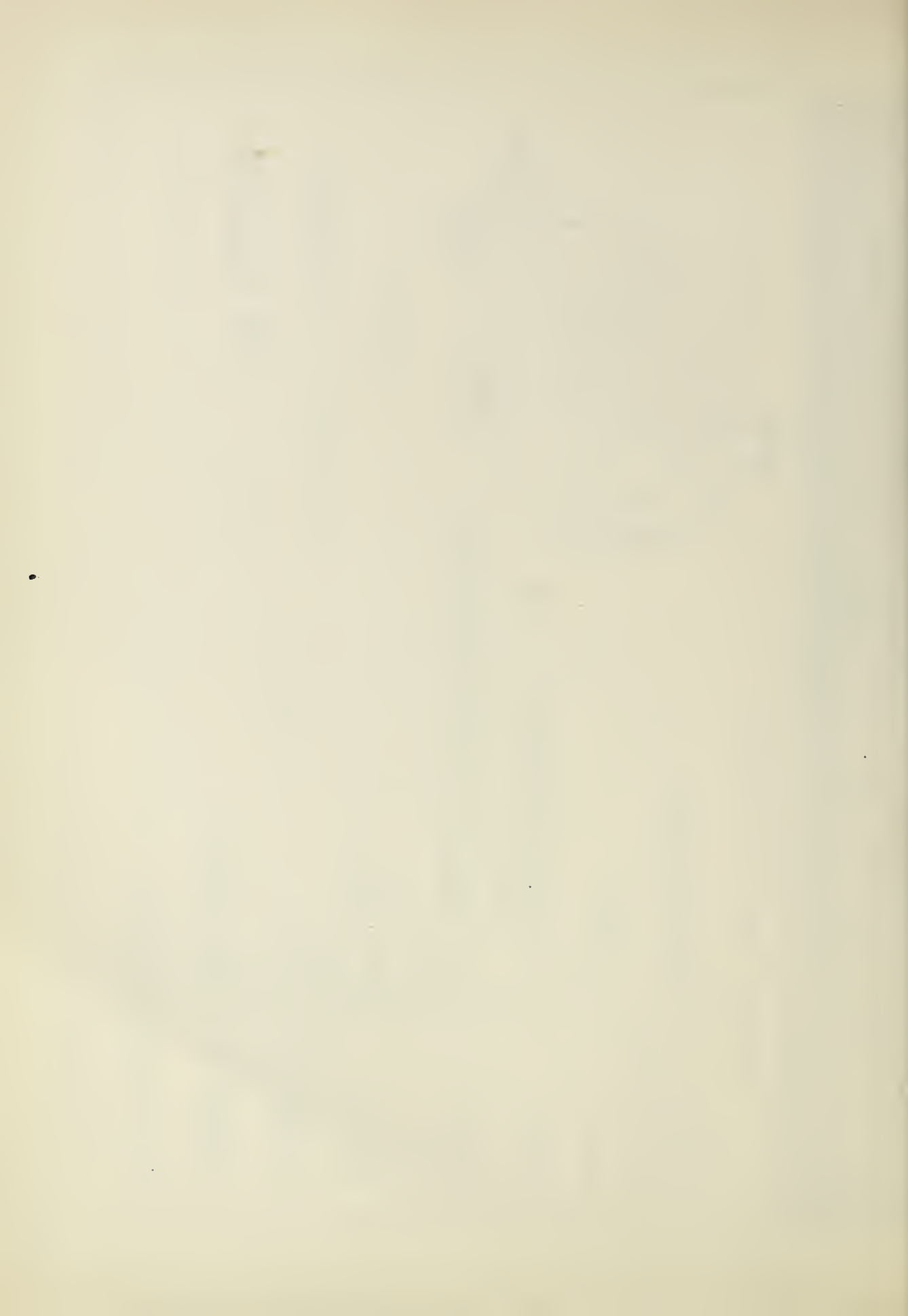


GRAIN .....



1935-39

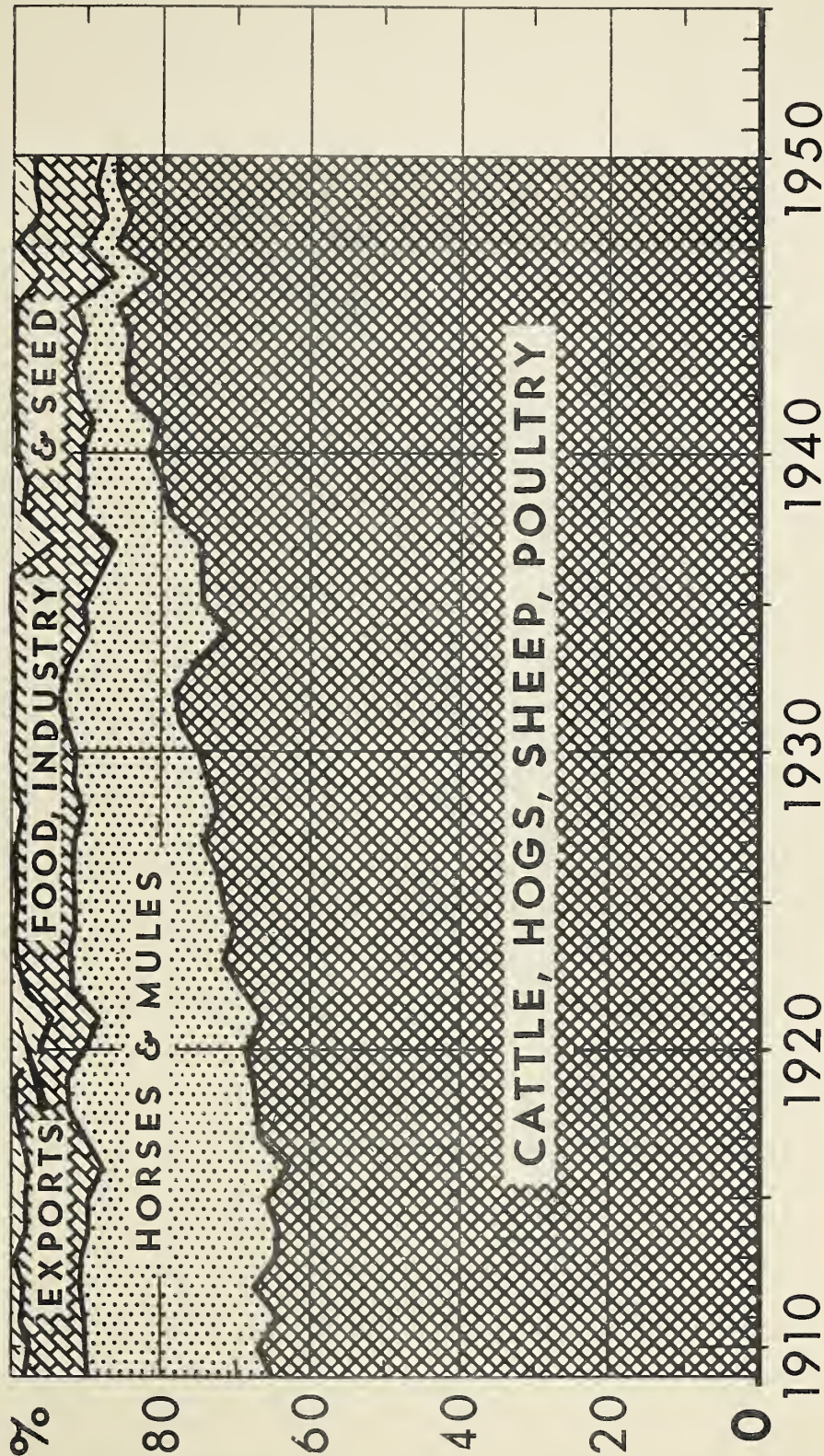
1951





# TRENDS IN USES OF CORN

*Percentages Devoted to Major Types of Use*



YEAR BEGINNING OCTOBER; 1909-25, BEGINNING NOVEMBER

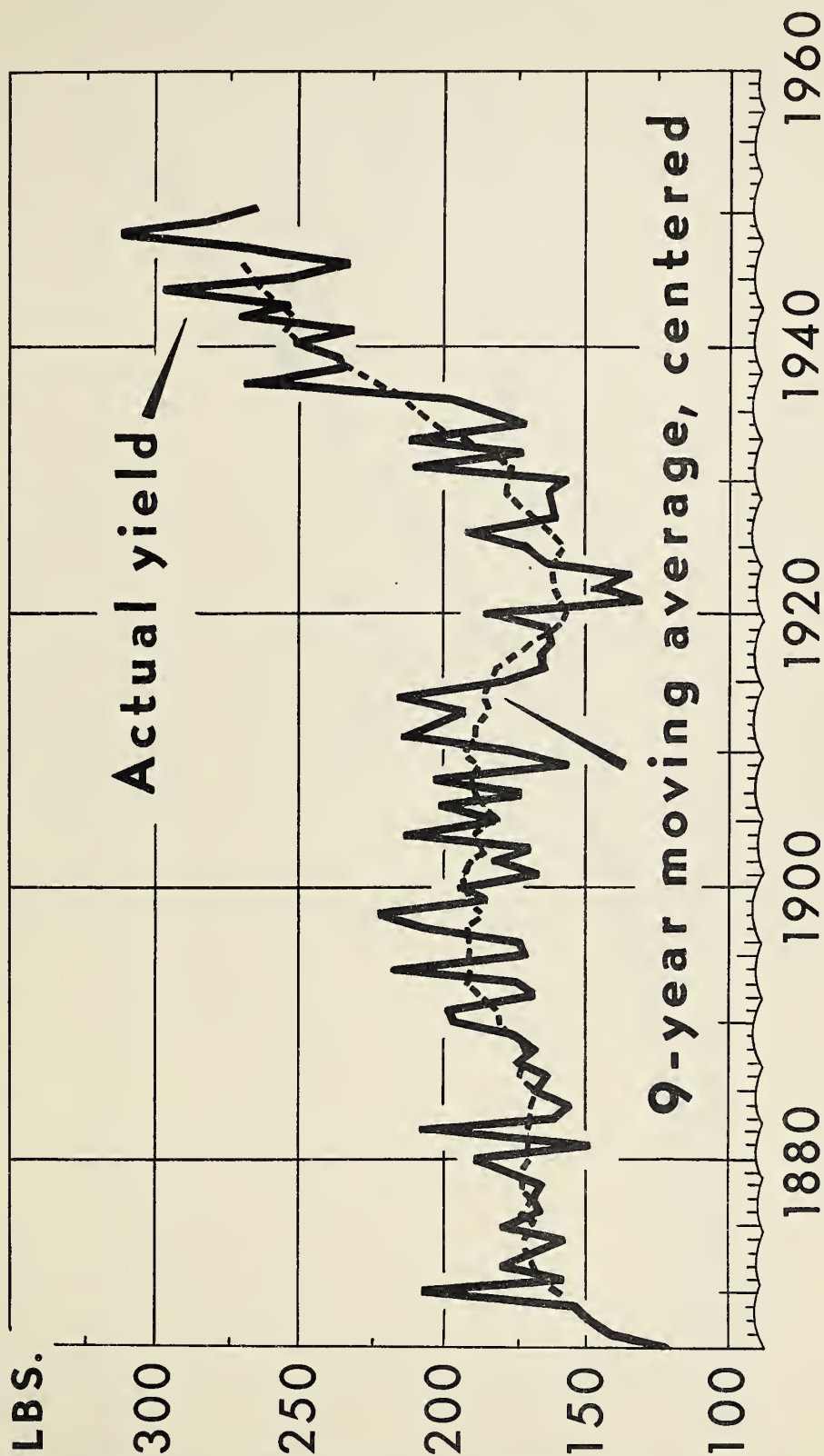
U. S. DEPARTMENT OF AGRICULTURE

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FIGURE 17



# AVERAGE YIELD PER HARVESTED ACRE OF COTTON IN THE U. S.



U. S. DEPARTMENT OF AGRICULTURE

NEG. 48219-XX BUREAU OF AGRICULTURAL ECONOMICS

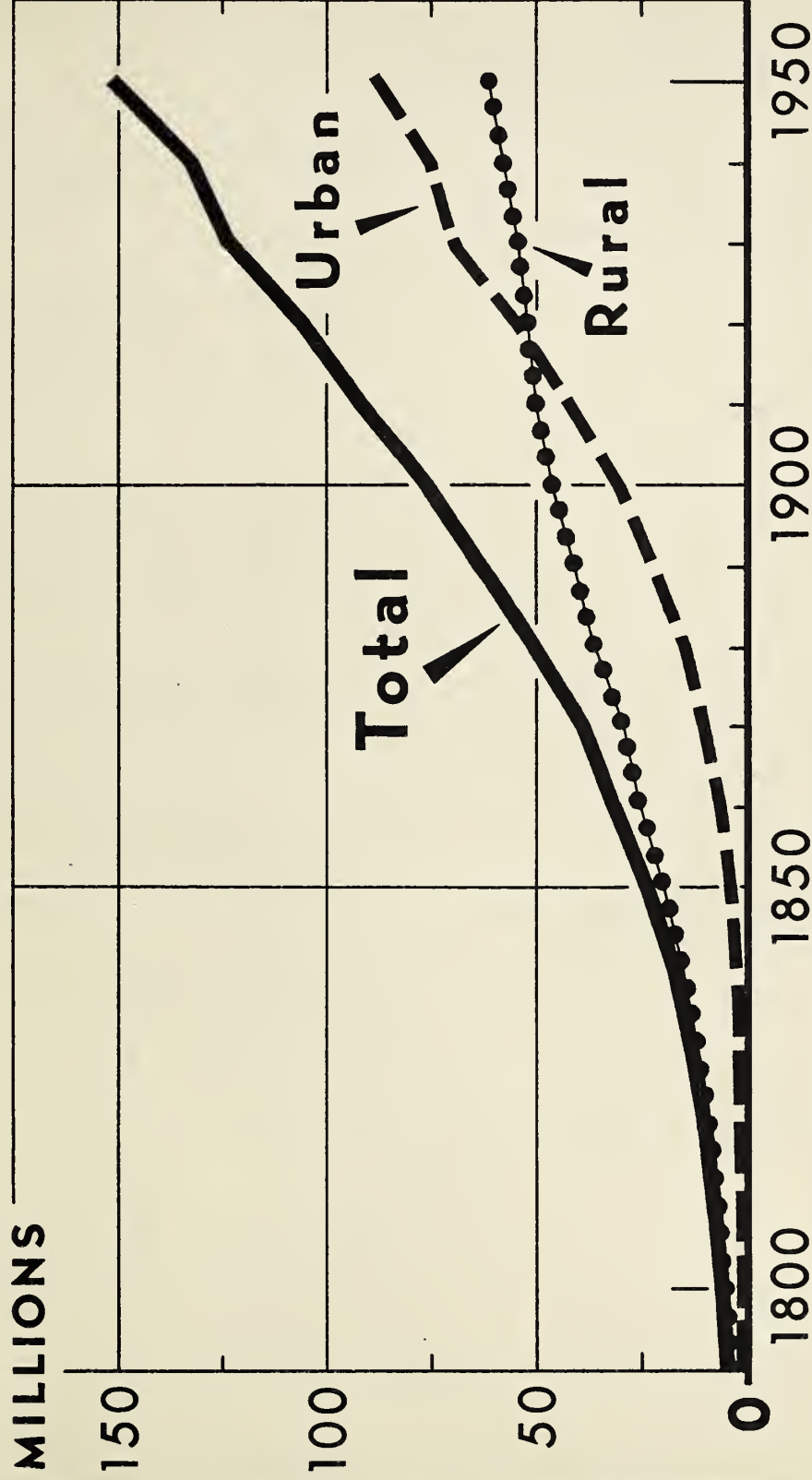
FIGURE 18





# U. S. POPULATION

## Rural and Urban



BUREAU OF THE CENSUS. ACCORDING TO 1940 RURAL-URBAN DEFINITION

U. S. DEPARTMENT OF AGRICULTURE

NEG. 48119-XX BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 19





STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Agricultural Marketing Act (RMA-Title II), Agriculture, (Bureau of Agricultural Economics):</u>			
Marketing research and service .....	\$1,135,926:	\$1,066,900:	\$1,162,900
<u>Flood Control, Agriculture (Bureau of Agricultural Economics):</u>			
Research on the economic aspects of flood control and comprehensive river basin surveys .....	28,943:	71,787:	96,000
<u>Administrative Expenses, Section 392, Agricultural Adjustment Act of 1938 (Bureau of Agricultural Economics):</u>			
For statistical services in connection with wheat acreage allotments and marketing quotas .....	21,238:	- -	- -
<u>Working Fund, Agriculture, Bureau of Agricultural Economics, (General Account):</u>			
<u>Advanced from:</u>			
<u>Department of Agriculture:</u>			
For study of family expenditures in selected counties of Montana (Bureau of Human Nutrition and Home Economics) .....	326:	- -	---
For furnishing cost-of-production data for various crops insured by the Federal Crop Insurance Corporation (Federal Crop Insurance Corporation) .....	115,247:	128,598:	- -
Total, Department of Agriculture.	115,573:	128,598:	- -
<u>Bureau of the Census:</u>			
For collecting basic data on prices received by farmers for specified crops and livestock products, and inventory values of specified livestock for use in connection with the 1950 Census .....	46,396:	14,904:	- -
<u>Federal Security Agency:</u>			
For conducting a consumer survey ..	5,498:	- -	- -
Total, General Working Fund .....	167,467:	143,502:	- -

(Continued on next page)

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Working Fund, Agriculture, General.</u>			
<u>(Bureau of Agricultural Economics:</u>			
<u>Advanced from:</u>			
<u>Department of Defense, Department of</u>			
<u>the Army:</u>			
For providing data in connection			
with a comprehensive survey of the:			
Arkansas-White-Red River Basin ..	13,588:	2,412:	- -
<u>Department of the Interior:</u>			
Development of an evaluation of the			
agricultural repayment feasibility			
of the Weber Basin Reclamation			
Project, Utah .....	4,576:	2,224:	- -
<u>National Security Resources Board:</u>			
For conducting an apparel wool			
survey .....	1,654:	- -	- -
Total, Working Fund, Agriculture,			
General .....	19,818:	4,636:	- -
<u>Working Fund, Agriculture, Bureau of</u>			
<u>Agricultural Economics, Advanced from</u>			
<u>Commodity Credit Corporation (Trust</u>			
<u>Account):</u>			
For collection of price and supply			
data on legume and grass seeds .....	30,119:	31,441:	- -
For collection of data on rice, beans			
and peas .....	28,181:	23,325:	- -
Total, Trust Working Funds .....	58,300:	54,766:	- -
<u>Miscellaneous Contributed Funds, Depart-</u>			
<u>ment of Agriculture, (Bureau of Agri-</u>			
<u>cultural Economics):</u>			
<u>Deposited by:</u>			
<u>Fruit industry:</u>			
For cooperative research with			
various contributors on marketing			
of fruits and fruit products .....	39,425:	7,000:	- -
<u>Hop Control Board, Salem, Oregon:</u>			
Special report on hop stocks as of			
June 1 .....	1,490:	1,510:	- -
<u>National Bureau of Economic Research:</u>			
For cooperative study of agricul-			
tural financing .....	6,360:	9,453:	- -

(Continued on next page)

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Miscellaneous Contributed Funds, Department of Agriculture, (Bureau of Agricultural Economics) - continued:</u>			
Deposited by:			
University of Michigan:			
For cooperative work with the University of Michigan, to develop improved methods of gathering statistical information .....	3,050:	- -	- -
University of Virginia:			
For cooperative work on factors associated with cotton yield variability .....	400:	- -	- -
Washington State Apple Commission:			
For survey of consumers' acceptance of frozen apple juice concentrate.	2,000:	- -	- -
Total, Miscellaneous Contributed Funds .....	52,725:	17,963:	- -
<u>Salaries and Expenses, Defense Production Activities, Agriculture (Bureau of Agricultural Economics):</u>			
For carrying out the provisions of the Defense Production Act of 1950 .	53,273:	100,000:	- -
<u>Mutual Security Agency (Allotment to Agriculture) (Bureau of Agricultural Economics):</u>			
For expenses in connection with training foreign nationals .....	33,219:	16,460:	- -
<u>Obligations under reimbursements from Governmental and other Agencies:</u>			
Salaries and expenses .....	32,471:	45,000:	45,000
Agricultural Marketing Act .....	1,220:	- -	- -
Total .....	33,691:	45,000:	45,000
TOTAL, OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS .....	1,604,600:	1,521,014:	1,303,900





## PASSENGER MOTOR VEHICLES

It is anticipated that the Bureau will need to replace 12 passenger motor vehicles in the fiscal year 1953 at a net cost of \$1,100 each, or a total of \$13,200.

These 12 cars to be replaced constitute 25% of the total number of cars operated by the Bureau of Agricultural Economics. All of the automobiles proposed for replacement are within the replacement standards established by the Bureau of the Budget which provide that the cars must be 6 or more years of age and have been driven 60,000 miles or more.

The 48 cars operated by the Bureau are used in the field by agricultural statisticians in the crop and livestock reporting service and by research specialists chiefly on farm management and land use studies.





AGRICULTURAL RESEARCH ADMINISTRATION

Purpose Statement

The Agricultural Research Administration was established by the Secretary of Agriculture on December 13, 1941. This action was confirmed by Executive Order No. 9069, issued February 23, 1942. The organization was continued without change under Reorganization Plan No. 1 of 1947. It is composed of the following units:

- Office of Administrator (including the Agricultural Research Center)
- Office of Experiment Stations
- Bureau of Human Nutrition and Home Economics
- Bureau of Animal Industry
- Bureau of Dairy Industry
- Bureau of Agricultural and Industrial Chemistry
- Bureau of Plant Industry, Soils, and Agricultural Engineering
- Bureau of Entomology and Plant Quarantine

Through these agencies the Administration carries on most of the Department's research in the physical and biological sciences. It operates the 12,000 acre Agricultural Research Center at Beltsville, Maryland, where numerous research projects of the Department's bureaus, including some bureaus outside the Agricultural Research Administration, are under way. Much of the Administration's research is conducted in cooperation with the State Agricultural experiment stations and with other research agencies, both public and private.

The Administration also conducts those control and regulatory programs of the Department which involve the enforcement of plant and animal quarantines, meat inspection, and the control of diseases and insect pests of animals and plants.

The Administration is responsible for the program of Federal-grant funds made available to the States for the operation of agricultural experiment stations and for the coordination and integration of research work under way in the Department with that of the State agricultural experiment stations.

A more detailed discussion of work performed is included in the statements prepared by the individual bureaus of the Administration.

OFFICE OF ADMINISTRATOR, ARA

The Office of Administrator, Agricultural Research Administration, includes scientific and administrative personnel engaged in planning, coordinating, and directing, in conjunction with Bureau chiefs, the research and regulatory programs of agencies within the Administration to assure effective utilization of resources and an integrated research program which, in the light of research conducted by other public agencies, and private industry, is adapted to the changing needs of agriculture and the Nation's requirements for food, feed, and fiber.

Attached to the Office of Administrator, and subject to his supervision, is the Agricultural Research Center at Beltsville, Md., which provides facilities and services for many scientific investigations carried on by various agencies of the Department.

The Agricultural Research Administrator is responsible for all research work of the Department (other than economic) and administers specific related programs such as:

1. Agricultural Marketing Act (RMA--Title II)
2. Federal research program on agricultural problems of Alaska
3. Research on strategic and critical agricultural materials

The staff included on November 30, 1951, 67 employees in Washington and 361 full-time and 55 part-time employees engaged in field activities, located principally at Beltsville, Md., and in Alaska.

	<u>Estimated, 1952</u>	<u>Budget Estimate, 1953</u>
Appropriated funds:		
Salaries and expenses	\$582,440	\$581,000
Research on agricultural problems of Alaska	270,000	270,000

# AGRICULTURAL RESEARCH ADMINISTRATION

## (a) Office of Administrator

Appropriation Act, 1952 .....	\$541,440
Anticipated pay adjustment supplemental .....	41,000
Base for 1953 .....	<u>582,440</u>
Budget Estimate, 1953 .....	581,000
Decrease (partial absorption of pay adjustment costs) .....	<u><u>-1,440</u></u>

## PROJECT STATEMENT

Project	1951	1952 (estimated)	Decrease (pay adjustment absorption)	1953 (estimated)
1. Administration and over- all direction of the Agricultural Research Administration .....	\$334,715	\$342,800	-\$800	\$342,000
2. Supervision of mainte- nance, operation, and furnishing of facilities and services at the Agricultural Research Center .....	248,463	239,640	-640	239,000
Unobligated balance .....	2,638	- -	- -	- -
Total pay adjustment costs ...	[- -]	[41,400]	[-700]	[40,700]
Total available or estimate..	<u>585,816</u>	<u>582,440</u>	<u>-1,440</u>	<u>581,000</u>
Transfer in 1952 estimates to "Salaries and expenses, Office of the Secretary of Agriculture" .....	+9,184	- -		
Reduction pursuant to Sec. 1214 .....	+5,000	- -		
Anticipated pay adjustment supplemental .....	- -	-41,000		
Total appropriation or estimate .....	<u>600,000</u>	<u>541,440</u>		



## CHANGES IN LANGUAGE

The estimates propose deletion of certain language (deleted matter enclosed in brackets) as follows:

- For necessary expenses \* \* \* and the cost of altering any one building during the fiscal year shall not exceed \$2,500 or 2 per centum of the cost of the building as certified by the Research Administrator,
- 1 whichever is greater [, except for the alteration of one building at Greenfield, Massachusetts, at a cost
  - 2 not to exceed \$7,500: Provided further, That not to exceed 7 per centum of the funds of any research appropriation of the Agricultural Research Administration, including the appropriation for the Office of the Administrator, may be transferred by the Administrator, with the approval of the Secretary, to any other such research appropriation in order to provide for a more effective research program: Provided, however, That no appropriation may be increased more than 7 per centum by such transfers].

The first change in language eliminates authority for the alteration of a building at Greenfield, Massachusetts, since installation of a furnace and other alterations will be completed with 1952 funds, and retention of this authority will not be necessary in 1953.

The second change in language eliminates the provision in the 1952 Agricultural Appropriation Act which authorizes the Administrator to make transfers of up to 7% between research appropriations of the Agricultural Research Administration. This authority is permanent in character and, therefore, its retention in the annual appropriation act is unnecessary.

STATUS OF PROGRAM

1. Administration and Over-all Direction of the Agricultural Research Administration

The Administrator, with the assistance of his immediate staff, is responsible for planning, coordinating, and directing the research program and the control and regulatory programs of the Agricultural Research Administration; is responsible for research activities (other than economic research) of all other agencies of the Department; and develops, in cooperation with directors of State and Territorial Agricultural Experiment Stations and 21 RMA advisory committees, and in the light of research conducted by other public agencies and private industry, an integrated research program which will best meet the changing needs of agriculture and the Nation's requirements for food, feed, and fiber.

The major activities in 1951 were as follows:

- a. Further progress was made in the integration and coordination of research activities. The Advisory Committees established under authority of the Research and Marketing Act have been brought into closer touch with the entire program of research and marketing service in their respective areas of work, and their recommendations actively considered in program formulation.

Since 1948, the year in which these committees were first created, 69% of their recommendations were implemented in whole or in part.

Advisory Committee meetings were held somewhat more frequently than in former years and in some cases the sessions lasted three instead of two days. Members of the staff served as Executive Secretaries to the Committees, arranged for the required facilities, prepared condensed progress reports on selected work of interest to each committee, listed problems or fields of work for their consideration, secured participation by Departmental specialists, recorded the actions taken and the recommendations made, and prepared and distributed the final reports approved by the Committees.

A meeting of Advisory Committee Chairmen also contributed greatly to mutual understanding and the improvement of Committee procedures.

The Executive Secretaries of Advisory Committees also kept committee members currently informed of the results of research by forwarding publications and special reports as they became available. Contacts were continued with special industry or commodity groups to inform them of progress in their fields of interest. Members of the staff also served as chairmen to approximately 20 working groups of technical subject-matter specialists within the Department.



During the latter part of fiscal year 1950 and the early part of fiscal year 1951, a special subcommittee of the House Committee on Agriculture (usually referred to as the Doane Study Group) made a comprehensive survey of the Department's research and related programs. The Administrator and his staff prepared considerable material requested by this group and met frequently with them to discuss questions concerning the Department's research and related program.

The Study Group reported its findings and recommendations to the House Committee on Agriculture, which then held hearings. At these hearings, the Department was requested to prepare a report containing a complete listing and description of all research and related activities carried on within the Department of Agriculture and by the Department in cooperation with the State land-grant colleges and other State agencies. Most of the material for this report was prepared by the agencies of the Department actually carrying out the work, and was then reviewed in the Administrator's Office and put in final form for printing. The report was printed by the House Committee on Agriculture in three volumes containing 2,729 pages. It is the only complete reference work of its kind which has ever been prepared and should be of great value to Members of Congress; research workers in the Department, the State Agricultural Experiment Stations, and private research institutions; extension workers; students and any other group interested in obtaining complete information on those programs which the report covers.

At the present time, a comprehensive index is being prepared which, when printed, will make the report even more valuable as a reference source on the research and related programs of the Department.

- b. A Program and Policy Board, consisting of the ARA Administrator, his Assistant Administrators and the ARA Bureau Chiefs, has met at least weekly to discuss matters of common concern. One result of this consideration has been an ARA-wide revision and evaluation of programs designed to insure that the full resources of the bureaus are devoted to those projects most important in the present emergency.
- c. A special assistant to the Administrator was designated to spearhead and expedite all ARA activities related to defense. Such activities have been extensive and varied, including development of the research program on strategic and critical agricultural materials in consultation with the Munitions Board; direction of the planning of programs to protect the Nation's crops and livestock against the hazards of biological warfare in cooperation with the Federal Civil Defense Administration; participation in departmental and inter-departmental determinations of production goals, requirements, allocations, and allotments of products relating to agriculture; and general



liaison with the Production and Marketing Administration of the Department, the Department of Defense, the Office of Defense Mobilization, and other emergency agencies. This arrangement has resulted in an improved integration of the many defense activities of the bureaus and offices of ARA.

- d. The Research Administrator served as a member of the inter-agency committee which develops U. S. recommendations as to FAO programs, and as Chairman of the FAO International Standing Committee on Agriculture and the FAO Working Group on Long Term Policies and Objectives. He is a member of the Interdepartmental Committee on Scientific Research and Development, and members of the Administrator's staff served on the Subcommittees on Scientific Personnel and on Budgetary Procedures. Staff members also served on many important national committees such as the Advisory Committee for Scientific Research of the Textile Research Institute, the Joint USDA-Land Grant College Committee on Agricultural Services to Foreign Areas, the Committee on Specialized Personnel of the Office of Defense Mobilization, the Food and Nutrition and the Agricultural Boards of the National Research Council, the Government Patents Board, and the National Forest Advisory Board of Appeals; and as consultants to the Atomic Energy Commission, to the Research and Development Board and the Munitions Board of the Department of Defense.
- e. The Department's research on the agricultural problems of Alaska continued to be a direct responsibility of the Administrator and was carried out in accordance with the intent of Congress, expressed in the 1950 Agricultural Appropriation Act, as a joint Federal-Territorial program cooperative with the Experiment Station of the University of Alaska.
- f. The Central Project Office continued to serve the Department through the performance of four essential functions:

It serves as a central control for routing and clearance of proposals to initiate, modify, and discontinue research, marketing service and statistical projects.

It maintains by means of comprehensive agency and subject-matter files a readily available store of information of about 4,000 current departmental projects in these fields.

It prepares analyses of the current research program of the Department, both as a whole and in particular commodity of functional fields, for the purposes of revealing points of over- and under-emphasis, possible duplication of effort, and opportunities for cooperative endeavor among different agencies.

It prepares descriptive summaries of research in particular fields for the use of advisory committees, research workers in the Department and in State Agricultural Experiment Stations, research coordinators, and others.

During fiscal year 1951, a quantitative functional analysis of the Department's research program was prepared, blending the work of 12 agencies. The analysis was graphically portrayed in three-dimensional diagrams and used to acquaint RMA advisory committees and others with the Department's complex and highly integrated research activities.

The following figures indicate that part of the workload of this office which is measurable:

	<u>1950</u>	<u>1951</u>
<u>Projects in force at end of fiscal year:</u>		
Financial .....	129	132
Work .....	761	747
Line .....	<u>3,221</u>	<u>3,305</u>
Total .....	<u>4,111</u>	<u>4,184</u>

Changes in financial, work, and line projects during fiscal year:

Projects added to the file .....	1,147	835
Projects extended .....	213	258
Projects discontinued .....	192	496
Projects superseded .....	320	277

2. Supervision of Maintenance, Operation and Furnishing of Facilities and Services at the Agricultural Research Center

The Agricultural Research Center furnished facilities and services to agencies conducting research at the Center as follows: upkeep of Center grounds; furnishing guards and 24-hour telephone service; operation of mail and messenger service; health unit and emergency first aid service; fire protection; construction and maintenance of roads; operation of sewage disposal plant and system; operation of water treatment plant; and performance of administrative services in connection therewith.

Services were furnished to ten bureaus of the Department and several other government agencies conducting research and experimental work at the Center. Most of these services were furnished on a reimbursable basis under the "Working Capital Fund, Agricultural Research Center." These services included heat, electricity, gas and water; maintenance, construction and repair of structures and equipment; mechanical shop services; engineering services; general farm work; and supplies as requested by the bureaus.

(b) Working Capital Fund, Agricultural Research Center

This working capital fund is a continuing operating fund of \$300,000 established by the 1951 Agricultural Appropriation Act to pay the operating costs of certain centralized services and facilities at the Agricultural Research Center pending receipt of reimbursements for such costs from the bureaus and agencies provided with the services. The integrity of the original appropriation is maintained from year to year by means of these reimbursements.

Statements reflecting the assets and liabilities and income and expense of the working capital fund as of June 30, 1951, as well as estimates for 1952 and 1953, are printed in the Budget schedules and in the Subcommittee Print for the fiscal year 1953.

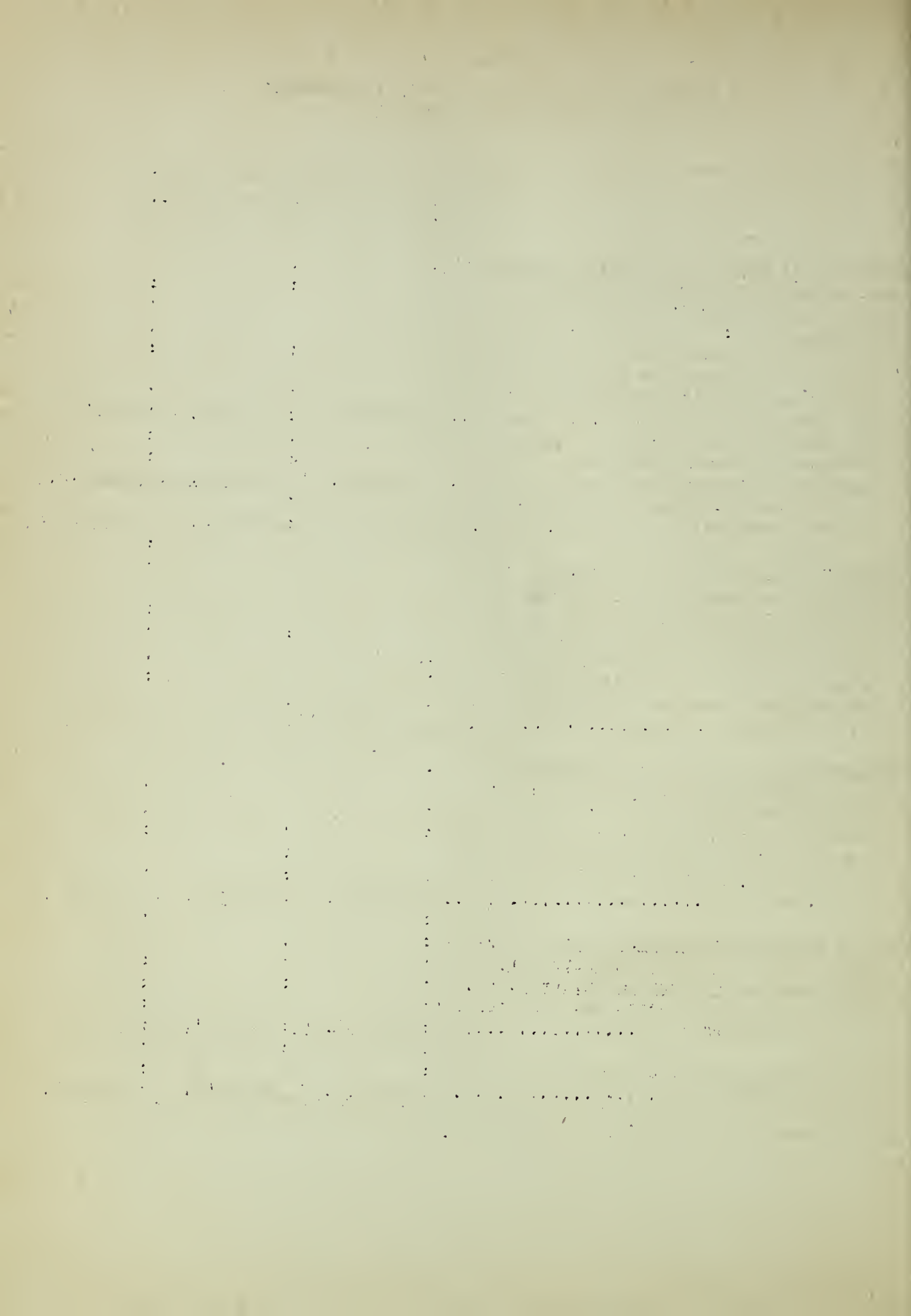




STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS  
AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Agricultural Marketing Act (RMA--Title II), Agriculture (Office of Administrator, Agricultural Research Administration):</u>			
For over-all administration, planning, and coordination of research under the Agricultural Marketing Act (RMA--Title II) .....	\$108,962:	\$110,800:	\$110,800
For inventory and analysis of agricultural research, marketing service, and statistical projects.	15,864:	12,000:	12,000
Total, Agricultural Marketing Act (RMA--Title II) .....	124,826:	122,800:	122,800
<u>Working Fund, Agriculture, General (Office of Administrator, Agricultural Research Administration):</u>			
For sponsoring, planning, and administering training programs in the general field of agriculture for agricultural leaders of occupied countries .....	43:	--	--
<u>Obligations under reimbursements from Governmental and other agencies:</u>			
Salaries and expenses:			
Reimbursements for supplies and services furnished the Plant Industry Station at Beltsville, Maryland .....	649,000:	606,100:	604,400
<u>Mutual Security (Allotment to Agriculture) (Office of Administrator, Agricultural Research Administration):</u>			
For expenses incident to the foreign trainee program .....	44,685: a/	65,046:	--
TOTAL, OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS .....	818,554:	793,946:	727,200

a/ Allotment as of December 31, 1951.





RESEARCH ON AGRICULTURAL PROBLEMS OF ALASKA

Appropriation Act, 1952 .....	\$250,000
Anticipated pay adjustment supplemental .....	20,000
Base for 1953 .....	<u>270,000</u>
Budget Estimate, 1953 .....	<u>270,000</u>
Change .....	<u>- -</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	1953 (estimated)
1. Research on agricultural problems of Alaska .....	\$279,730	\$270,000	\$270,000
Unobligated balance .....	270	- -	- -
Total pay adjustment costs ...	<u>[- -]</u>	<u>[22,000]</u>	<u>[22,000]</u>
Total available or estimate..	<u>280,000</u>	<u>270,000</u>	<u>270,000</u>
Anticipated pay adjustment supplemental .....	<u>- -</u>	<u>-20,000</u>	
Total appropriation or estimate .....	<u>280,000</u>	<u>250,000</u>	



## STATUS OF PROGRAM

Agricultural research in Alaska is carried on as a joint program of the U. S. Department of Agriculture and the University of Alaska. The University is the Land-Grant College of the Territory and receives grant funds under the Hatch, Adams, Purnell, Bankhead-Jones and Research and Marketing Acts, as well as appropriations made by the Territory.

Under a joint director mutually agreeable to the University Board of Regents and the Research Administrator of the U. S. Department of Agriculture, investigations are conducted in soil analysis, horticulture, animal husbandry, agricultural economics, agricultural engineering, insect control, and field crop improvement. These investigations have as their object increasing farm production and stabilizing the rural economy of the Territory.

### Selected Examples of Recent Progress:

1. Soil and fertilizer studies indicate that fertilizer applications are essential for efficient food production in Alaska, and that newly cleared land requires more fertilizer than fields that have been previously farmed and fertilized. Potato and truck farmers can profitably use 800 to 1,000 pounds of commercial fertilizer per acre and dairy enterprises can lower feed production costs and increase yields by 50 to 100 per cent by following experiment station findings in soil and fertilizer studies.
2. Potato breeding and variety testing have resulted in the selection of 10 breeding lines of potatoes from over 8,000 seedlings. These 10 strains are superior to any of the named varieties in eye depth, smoothness of skin, and productivity. They are now being planted in seven different Alaskan farming areas in cooperation with commercial growers to determine their adaptability to growing in different sections of the Territory.
3. The plant pathologist of the station has inaugurated a program for the establishment of disease-free sources of seed potatoes to reduce the losses from ring rot. The incidence of other seedborne diseases of potatoes will be reduced through the same program. The pathologist is also studying different methods of controlling injurious plant diseases of other farm crops.
4. Entomological studies have shown that properly timed applications of Chlordane or Aldrin give excellent control of cutworms attacking vegetables and other crops.



5. The first dairy heifers under the Holstein x Red Dane cross-breeding program are now beginning to produce milk and the preliminary results indicate that they will be 10 to 20 per cent better producers than their dams. This, together with an increased number of cows, will nearly double in 1952 the amount of milk produced in the Territory in 1948. Since the introduction of Red Dane bulls and the development of silos to maintain feed supplies throughout the winter, nearly all heifers and male calves are now being raised in the Territory. Further investigations are needed to insure the practicability and profitability of raising bull calves to maturity for beef.
6. Experimental cabins are being tested to determine the practicability of utilizing native lumber for farm and home construction. This has been difficult heretofore owing to the small size and low quality of some of the lumber available from local wooded areas. At least one method of utilizing these native timber stands has been worked out that has been found comparable to the conventional construction methods adapted to the use of imported lumber, and means of protection against heating losses are being worked out.
7. The data being obtained from economic analysis of the types of farming in Alaska are showing how to make more efficient use of farm resources so that more production of high quality Alaska feeds and foods can be obtained. Information is also being gathered by the agricultural economics department on the improvement of marketing methods, location of marketing outlets, and consumer preferences in order to increase the consumption and demand for Alaska products.
8. It has been found that roughage in Alaska can be processed as silage much cheaper than field-cured hay, resulting in much lower losses in the winter in dry matter and high quality feed. Some hay is made from the first cutting of grass, and silage is made from the second cutting. It takes 25 to 40 per cent less acreage to feed a cow all winter on silage than on field-cured hay.
9. Cereal investigations have resulted in the release of two superior cereal varieties in the spring of 1951, Golden Rain Oats and Edda Barley. This work is making a substantial contribution to successful cereal production in Alaska, and shows the possibilities for the development of local sources of seed and feed grain. Extensive searches are being made for superior germplasm in the tests of large numbers of forage species and varieties from various parts of the world. The World Collection of Barley (5,215 varieties) and the World Collection of Oats (3,874 varieties) are under test. Studies are being made on the practicability of growing flax in Alaska.

10. A variety of red clover and one of yellow-flowered alfalfa developed by the Alaska Station are now under increase in the State of Washington and should be ready for distribution to Alaskan farmers by 1952 and 1953. While these are only partially successful as a solution of the production of legume forage in Alaska, they will provide a source of breeding stock from which improved varieties can be developed.





## OFFICE OF EXPERIMENT STATIONS

### Purpose Statement

The Office of Experiment Stations as presently organized was established in 1888 following passage of the Hatch Act of 1887 authorizing Federal grants for State agricultural experiment stations.

The primary function of the Office of Experiment Stations is the administration of the Acts of Congress authorizing Federal-grant funds for research at the agricultural experiment stations of the Land Grant Colleges in the States, Hawaii, Alaska, and Puerto Rico. A major responsibility involved in this function is the coordination of research effort among the State experiment stations and between these experiment stations and the research agencies of the Department of Agriculture. The Office also has responsibility for operating the Federal Experiment Station in Puerto Rico and the Virgin Islands Agricultural Program.

Grant Fund Administration. Administration of grants to the States involves (1) advance approval of each individual research proposal financed in whole or in part from the Federal-grant funds to assure their efficient and legal use; (2) close advisory relations with the experiment stations for which funds are expended; (3) annual field examination of the research and expenditures of each experiment station under the several grant acts; and (4) preparation of an annual report to Congress on this research, as required by law. There are currently active approximately 4,500 specific lines of agricultural investigations being financed from Federal-grant funds which are a responsibility of this Office, as well as approximately 5,350 other lines of inquiry at the State agricultural experiment stations which are supported from non-Federal funds.

Research Coordination. The Office participates actively in the planning and coordination of research among the experiment stations and between the stations and the Department of Agriculture. Members of the technical staff of the Office (1) assist the States in planning cooperative research programs to secure integration and full coordination; (2) assist Federal research agencies in arranging for cooperation with the States; (3) actively participate in planning conferences and work groups engaged in development of regional research involving two or more States; and (4) suggest to the States lines of inquiry most needed to establish well-rounded regional programs.

Administration of Programs in Puerto Rico and the Virgin Islands. The Office is responsible for administering the Federal Experiment Station in Puerto Rico which serves as a tropical outpost of the Department for the conduct of agricultural research dealing principally with the development and production of crops of strategic importance which can be grown only in the tropics and with other crops which may be of economic importance especially to the Southern States. It also is responsible for administering an agricultural program in the Virgin Islands dealing with research on soil and water conservation, improvement of crop plants for commercial and home use, and development of better rural living conditions.

As of November 30, 1951, the Office had 104 employees, 58 of whom were in Washington and the balance in the field.

	Estimated, <u>1952</u>	Budget Estimate, <u>1953</u>
Appropriated funds:		
Payments to States, Hawaii, Alaska, and Puerto Rico	\$12,428,708	\$12,453,708
Salaries and Expenses	390,090	389,000
Virgin Islands Agricultural Program	<u>- -</u>	<u>100,000</u>
	<u>12,818,798</u>	<u>12,942,708</u>

Summary of Appropriations, 1952 and Estimates, 1953

	: Total	: Budget	: Increase (+)
	: estimated	: estimates,	: or
	: available,	: 1953	: Decrease (-)
	: 1952		
Payments to States:	:	:	:
Hatch Act .....	: \$720,000:	\$720,000:	- -
Adams Act .....	: 720,000:	720,000:	- -
Purnell Act .....	: 2,880,000:	2,880,000:	- -
Bankhead-Jones Act, secs. 3	:	:	:
and 5, Title I .....	: 2,863,708:	2,863,708:	- -
Bankhead-Jones Act, secs. 9	:	:	:
and 11, Title I (as amended	:	:	:
by the Act of August 14,	:	:	:
1946) .....	: 5,000,000:	5,000,000:	- -
Hawaii .....	: 90,000:	90,000:	- -
Alaska .....	: 65,000:	90,000:	+\$25,000
Puerto Rico .....	: 90,000:	90,000:	- -
Total payments to States ..	: 12,428,708:	12,453,708:	+25,000
Salaries and Expenses .....	: 390,090:	389,000:	-1,090
Virgin Islands Agricultural	:	:	:
Program .....	: - -:	100,000:	+100,000
Total, direct annual	:	:	:
appropriations .....	: 12,818,798:	12,942,708:	+123,910





(a) Payments to States, Hawaii, Alaska, and Puerto Rico,  
Office of Experiment Stations

Appropriation Act, 1952 .....	\$12,428,708
Budget Estimate, 1953 .....	<u>12,453,708</u>
Increase (to strengthen the research program of the Alaska Agricultural Experiment Station, as authorized by the Alaska Station Act of June 20, 1936, amended by the Act of August 29, 1950) .....	
	<u>+25,000</u>

PROJECT STATEMENT

Project	1951	1952 :(estimated):	Increase:	1953 :(estimated)
1. Hatch Act (March 2, 1887) .....	\$719,953:	\$720,000:	- -:	\$720,000
2. Adams Act (March 16, 1906) .....	719,690:	720,000:	- -:	720,000
3. Furnell Act (February 24, 1925) .....	2,879,455:	2,880,000:	- -:	2,880,000
4. Bankhead-Jones Act, secs. 3 and 5, Title I (Act of June 29, 1935) .....	2,863,166:	2,863,708:	- -:	2,863,708
5. Bankhead-Jones Act, secs. 9 and 11, Title I of the Act approved June 29, 1935, as amended by the Act of August 14, 1946 (Research and Marketing Act) .....	4,986,052:	a/ 5,000,000:	- -:	5,000,000
6. Hawaii Act (May 16, 1928) .....	89,951:	90,000:	- -:	90,000
7. Alaska Act (February 23, 1929) .....	15,000:	15,000:	- -:	15,000
8. Alaska Act (June 20, 1936) as amended by the Act of August 29, 1950 (P. L. 739) .....	37,500:	50,000:	+\$25,000:	75,000
9. Puerto Rico Act (March 4, 1931) .....	89,991:	90,000:	- -:	90,000
Unobligated balance .....	15,450:	- -:	- -:	- -
Total pay adjustment costs .....	[ - - ]:	[ 10,720 ]:	[ +380 ]:	[ 11,100 ]
Total appropriation or estimate ..	12,416,208:	12,428,708:	+25,000:	12,453,708

a/ Includes \$12,990 estimated savings due to Section 409 of 1952 Agricultural Appropriation Act. Of this amount, \$10,000 is being used to meet pay adjustment costs in 1952, leaving \$2,990 in reserve.

INCREASE

(1) An increase of \$25,000 to strengthen the research program of the Alaska Agricultural Experiment Station, authorized by the Alaska Station Act of June 20, 1936, as amended by the Act of August 29, 1950.

The recommended increase of \$25,000 would bring the appropriation to the amount authorized by the Alaska Station Acts of 1936 and 1950. This would place the Alaska Station on an equal basis with all the other experiment stations in the States, Hawaii, and Puerto Rico.

Current research in dairying:--Income from dairying represents one of the major sources of revenue for farmers in Alaska. The current experiment station program covers research in determining most economical and practical methods of raising dairy calves, improving dairy cattle through breeding and use of artificial insemination. Economic studies on the cost of production of dairy steers in Alaska have recently been initiated. This research has shown that good dairy calves can be raised economically under Alaska conditions on skim milk and locally-produced grains and forage. Farmers are rapidly adopting this practice of producing their own herd replacements now that they have (1) a source of good breeding stock from the artificial insemination association and (2) an improved supply of home-grown grain and forage.

Need for Increased Research:--Additional research with dairy cattle is needed, particularly research to determine suitable rations and management practices that will make it possible to produce a satisfactory grade of beef from male calves produced on dairy farms.

In the Matanuska Valley there are more than 1,000 dairy calves born each year. While a large percentage of the females, about 500, are raised each year for herd replacements and for expansion of the dairy industry, the remaining 500 bull calves are largely destroyed or marketed at a young age for veal. These bull calves offer a large potential source of beef, a food that is in short supply in the territory. If these bulls were raised as steers either as a supplement to the dairy enterprise or as a special business by farmers not interested in milk production or by new settlers getting started in the livestock business, it would not only increase the local meat supply but it would offer an economical opportunity for marketing pasture and range hay, silage, and surplus grain.

If 500 male calves were raised on the Matanuska project and marketed as steers at 2 years of age weighing 1,000 pounds, they would provide a meat supply of about 275,000 pounds annually. This would amount to an average of 60 pounds of beef for the approximately 4,500 people living in the Matanuska Valley. This is almost as much as the per capita beef consumption in the United States. If efficient low-cost methods of raising dairy steers could be developed through research, it would be to the advantage of the farmer by increasing his income and that of the consumer by greatly increasing the local supply of fresh, good quality meat. There are commercial dairies in other areas in Alaska where bull calves are available for feeding, which would provide a considerable increase to the local meat supply.

Studies are needed on the best feeding practices and the types of feeds needed to properly condition cull cows preparatory to economical marketing as beef. There are approximately 200 dairy cows marketed for beef each year because, for various reasons, they are no longer profitable milk producers. By properly conditioning these cows before marketing an additional profitable outlet for home-grown feed would be provided. It would also add to the quantity and quality of the local meat supply.



Preliminary investigations indicate that dairy steers can be raised profitably in Alaska. Before sound recommendations can be made to interested farmers intensive research must be undertaken to develop information on the nutritional value of Alaska grown feeds and on the most efficient and economical ways to feed, house, manage, and maintain dairy steers on farms and on ranges under Alaska conditions. Research is needed on the best weights and condition for marketing Guernsey, Holstein and Red Dane steers and crosses between these breeds. Investigations should be conducted to determine the best methods of marketing dairy steers in relation to available feed supplies, market and seasonal conditions. Studies also are required on the quality of the meat produced.

Since Alaska habitually has a short meat supply with practically no beef cattle industry, except on some of the islands where grazing is favorable, and since many of the agricultural areas in the territory proper are not particularly suitable for extensive grazing, it appears in the interest of the economic welfare of the Alaskan people and the agricultural industry, to develop ways of utilizing the bull calves which now are a byproduct of the dairy industry, to increase both the farm income and the fresh meat supply.

Specific research proposals outlining in detail the investigations to be undertaken would be reviewed carefully in advance to assure they are properly integrated and coordinated with research now in progress under the joint Federal-Territorial agricultural research program.

#### CHANGES IN LANGUAGE

The estimates include proposed changes in language as follows (new language underscored, deleted matter enclosed in brackets):

For payments to States, Hawaii, Alaska, and Puerto Rico to be paid quarterly in advance where applicable, to carry into effect the provisions of the following Acts relating to agricultural experiment stations:

Hatch, Adams, Purnell, Bankhead-Jones, and related Acts: \* \* \*

Bankhead-Jones Act, title I of the Act approved June 29, 1935 (7 U. S. C. 427-427g), sections 3 and 5, \$2,863,708, and sections 9 and 11 of said Act as added by the Act of August 14, 1946 (7 U. S. C. 427h, 427j), including administration by the Office of Experiment Stations in the United States Department of Agriculture, \$5,000,000, no part of which latter amount shall be used for beginning construction of any building costing in excess of \$15,000,

- 1 [except that a poultry breeding house may be constructed at Purdue University at a cost to this appropriation of not to exceed \$29,000] \* \* \* and the provisions of section 2 of the Act approved June 20,
- 2 1936, as amended (7 U. S. C. 369a, [Public Law 739, approved August 29, 1950]), extending the benefits of the Adams and Purnell Acts to the Territory of Alaska [\$50,000] \$75,000; Puerto Rico, the Act approved March 4, 1931, as amended (7 U. S. C. 386d-386f), extending the benefits of certain Acts of Congress to Puerto Rico, \$90,000; in all, payments to States, Hawaii, Alaska, and Puerto Rico, [\$12,428,708] \$12,453,708.

The first change is proposed for the purpose of deleting language included in the 1952 Appropriation Act authorizing construction of a poultry breeding house at Purdue University as this authority will not be required in the fiscal year 1953. The poultry breeding house authorized in the 1952 Appropriation Act will be completed in the fiscal year 1952.

The second change is proposed for the purpose of deleting reference to Public Law 739 which is now incorporated in the United States Code.

## STATUS OF PROGRAM

General: The several appropriations under "Payments to States. . . ." represent the Federal Government's support and encouragement to the State, Territorial, and Puerto Rican agricultural experiment stations which were established as departments of the land-grant colleges pursuant to the provisions of the Hatch Act of 1887.

The State agricultural experiment stations conduct research and experiments along the lines authorized by the several Federal-grant fund acts and the complementary acts of the States on the many problems constantly encountered in the development of a permanent and sustaining agriculture and in the improvement of the economic and social welfare of the farm family. Because of differences in climate, soil, market outlets, and other local conditions, each State has distinct problems of production and marketing of crops and livestock. The farmers in the individual States naturally look to their State agricultural experiment stations for solution of State and local problems, and in recent years have requested increased service to help meet changing conditions.

The research programs of the State stations, to be most effective, include participation in regional and national programs. Joint attack by a group of State stations is the most effective and often the only practical approach to problems of common interest. The stations, to an ever increasing extent, are acting as regional groups to provide cooperative coordinated attacks on problems of regional and national interest. In a similar manner, the research programs of the State agricultural experiment stations and the Department of Agriculture are supplementary and interdependent.

These Federal-grant funds constitute a powerful force in bringing about inter-State cooperation and Federal-State collaboration in the planning and conduct of this over-all program of agricultural research. Therefore, the full impact of the Federal-grant funds on this program cannot be fully evaluated solely on the basis of the amount of funds thus provided.

Research at the stations during the fiscal year 1951 included approximately 4,500 specific lines of research financed wholly or in part by Federal-grant funds and about 5,350 lines of research under non-Federal funds available to the stations. These lines of research are continued as long as they are progressively productive. Approximately one-sixth of the research program passes its point of maximum productiveness annually and is replaced by new research on pressing problems.

Distribution of Payments. The following table indicates the distribution of funds to the various stations during the fiscal year 1952 under the formulas contained in the authorizing legislation.





TABLE A

Distribution by State of Federal-Grant Funds Authorized by the Hatch, Adams, and Purnell Acts, and Title I, Sections 5 and 9, Bankhead-Jones Act - Fiscal Year 1952

State	Hatch, Adams and Purnell Acts 1/	Title I, Section 5, Bankhead-Jones Act 2/	Title I, Sections 9(b)1 and 9(b)2 Bankhead-Jones Act 2/	Total Federal-Grant Funds
Alabama.....	\$ 90,000.00	\$ 89,054.23	\$ 115,041.79	\$ 294,096.02
Alaska.....	65,000.00	4,845.25	21,949.54	91,794.79
Arizona.....	90,000.00	16,764.33	32,077.36	138,841.69
Arkansas.....	90,000.00	66,473.01	95,114.82	251,587.83
California.....	90,000.00	102,575.23	94,682.62	287,257.85
Colorado.....	90,000.00	25,404.02	41,439.93	156,843.95
Connecticut.....	90,000.00	22,326.42	34,265.11	146,591.53
Delaware.....	90,000.00	5,980.24	24,266.78	120,247.02
Florida.....	90,000.00	47,901.94	54,346.06	192,248.00
Georgia.....	90,000.00	98,445.68	119,547.98	307,993.66
Hawaii.....	90,000.00	10,322.07	28,476.87	128,796.94
Idaho.....	90,000.00	16,843.81	35,722.90	142,566.71
Illinois.....	90,000.00	99,490.69	105,196.58	294,687.27
Indiana.....	90,000.00	79,339.64	89,871.89	259,211.53
Iowa.....	90,000.00	74,381.75	89,715.22	254,096.97
Kansas.....	90,000.00	52,983.12	65,675.84	208,658.96
Kentucky.....	90,000.00	92,922.65	114,383.73	297,306.38
Louisiana.....	90,000.00	60,875.32	82,836.29	233,711.61
Maine.....	90,000.00	22,320.73	37,141.75	149,462.48
Maryland.....	90,000.00	36,057.94	46,406.04	172,463.98
Massachusetts.....	90,000.00	36,538.02	42,599.60	169,137.62
Michigan.....	90,000.00	92,290.03	98,112.95	280,402.98
Minnesota.....	90,000.00	68,335.28	88,783.56	247,118.84
Mississippi.....	90,000.00	80,256.29	113,791.90	284,048.19
Missouri.....	90,000.00	78,909.57	101,176.29	270,085.86
Montana.....	90,000.00	17,974.56	34,561.24	142,535.80
Nebraska.....	90,000.00	41,426.30	56,439.59	187,865.89
Nevada.....	90,000.00	3,308.70	21,793.50	115,102.20
New Hampshire.....	90,000.00	11,313.84	27,746.65	129,060.49
New Jersey.....	90,000.00	32,568.56	40,586.45	163,155.01
New Mexico.....	90,000.00	16,978.30	34,793.12	141,771.42
New York.....	90,000.00	107,511.71	99,432.35	296,944.06
North Carolina.....	90,000.00	135,432.34	150,434.36	375,866.70
North Dakota.....	90,000.00	26,655.90	43,625.90	160,281.80
Ohio.....	90,000.00	118,743.55	119,313.70	328,057.25
Oklahoma.....	90,000.00	63,844.03	83,188.59	237,032.62
Oregon.....	90,000.00	35,218.01	46,553.61	171,771.62
Pennsylvania.....	90,000.00	155,523.13	129,271.40	374,794.53
Puerto Rico.....	90,000.00	66,206.90	94,198.81	250,405.71
Rhode Island.....	90,000.00	6,043.88	23,122.61	119,166.49
South Carolina.....	90,000.00	68,400.57	88,473.45	246,874.02
South Dakota.....	90,000.00	26,538.05	42,362.96	158,901.01
Tennessee.....	90,000.00	92,451.91	114,760.59	297,212.50
Texas.....	90,000.00	150,542.35	175,010.93	415,553.28
Utah.....	90,000.00	12,433.16	29,431.22	131,864.38
Vermont.....	90,000.00	12,864.24	29,555.64	132,419.88
Virginia.....	90,000.00	88,799.22	101,058.47	279,857.69
Washington.....	90,000.00	44,177.76	54,056.67	188,234.43
West Virginia.....	90,000.00	65,899.34	72,011.85	227,911.19
Wisconsin.....	90,000.00	73,438.42	89,550.21	252,988.63
Wyoming.....	90,000.00	7,776.01	26,044.57	123,820.58
Total.....	\$4,565,000.00	\$2,863,708.00	\$3,599,999.84	\$11,028,707.84
3/Regional Research Fund.....			1,250,000.00	1,250,000.00
Grand Total.....	\$4,565,000.00	\$2,863,708.00	\$4,849,999.84	\$12,278,707.84

1/ Alaska received \$15,000 Hatch, \$15,000 Adams, and \$35,000 Purnell funds; all other stations \$15,000 Hatch, \$15,000 Adams, and \$60,000 Purnell funds.

2/ Based on preliminary estimates of 1950 Rural Population Census data and 1940 Farm Population Census Data.

3/ These funds allotted to Regional Research projects recommended by the Committee of Nine, in accordance with procedures outlined in Section 9(b)3, Title I, of the Bankhead-Jones Act as amended.





Table B - Statement of direct payments to States, Hawaii, Alaska, and Puerto Rico, indicating those requiring offset and those not requiring offset, and basis of distributions, as estimated for 1953

Item	Total	Amount to	Amount Requiring Offset	
	: Estimate, 1953	: be paid without offset	: and Basis of Allotment	: Amount : Basis of Allotment
Hatch Act.....	\$ 720,000 <sup>a/</sup>	\$ 720,000	None	: Equal amounts to each State.
Adams Act.....	720,000 <sup>a/</sup>	720,000	None	: Equal amounts to each State.
Purnell Act.....	2,880,000 <sup>b/</sup>	2,880,000	None	: Equal amounts to each State.
Bankhead-Jones Act, secs. 3 and 5, Title I.....	2,863,708	--	\$2,863,708	: Principally on the basis of rural population in the States, Territories and Puerto Rico
Bankhead-Jones Act, secs. 9 and 11, Title I (as amended by the Act of Aug. 14, 1946).....	4,850,000	1,250,000	3,600,000	: 20% in equal amounts to each State, Territory and Puerto Rico; not less than 52% by formula: 1/2 on basis of relative rural population, 1/2 on basis of relative farm population, 25% as regional research funds.
Hawaii Station Act.....	90,000	90,000	None	: These Station Acts extend benefits of Hatch, Adams, and Purnell Acts to the Territories in the same amounts as to States.
Alaska Station Act of Feb. 23, 1929.....	15,000	15,000	None	: Same amounts as to States.
Alaska Station Act of June 20, 1936, as amended by the Act of Aug. 29, 1950...	75,000	75,000	None	: Same amounts as to States.
Puerto Rico Station Act....	90,000	90,000	None	: Same amounts as to States.
Total, direct Federal payments	12,303,708	5,840,000	6,463,708	

a/ \$15,000 to each State.

b/ \$60,000 to each State.



Initiation and Completion of Regional Research Projects. Within the period since the allotments under Section 9 of the Research and Marketing Act have been available, 79 cooperative regional projects have been initiated as shown below:

Table C - Regional Research Projects

Fiscal Year	Projects Started	Projects Completed	Total Active Projects
1948	52	—	52
1949	3	—	55
1950	18	3	70
1951	5	5	70
1952	1	2	69
Total	79	10	69

In addition to the 10 projects that have been completed, specific phases of other projects have been completed and the objectives and procedures of a number of regional projects have been revised. The new project undertaken in 1952 deals with the marketing of grain in the North Central region.

Examples of Research Findings That Reached the Stage of Public Application During the Year.

1. Electrostatic Dusting Process Developed. Getting insect and disease killing dusts to stick over greater surface of treated plants is a problem agriculture has tried to solve for years. The Michigan Experiment Station has now developed what it calls an electrostatic dusting process that gives from 500 to 1,000 percent better coverage on plants than does untreated dust. Dust particles, on leaving the nozzle of the duster, get an electric charge, about as strong as that in an electric fence, which may be held for several seconds. Plants set up an opposite charge and, like a magnet, draw the dust particles to under sides of leaves.
2. Mist Concentrate Sprays Profitable. One of the costliest Operations in commercial fruit growing has been that of meeting spraying schedules that would reduce both insect and disease damage. The Pennsylvania station, in cooperation with commercial growers, extension specialists and chemical spray manufacturers, has developed methods for using mist concentrate sprays that have reduced spraying costs to peach growers approximately 20 cents a bushel. In 1950 more than 1,000 acres of apples, peaches, and cherries were sprayed with concentrates. Over 30,000 acres in the area are in blocks large enough for concentrate spraying. General adoption of the methods recommended could save southern Pennsylvania growers about \$1,900,000 per year.



3. Growth Promoting Effects of Antibiotics. Research leading to the discovery of the growth-promoting abilities of antibiotic drugs, reported by a scientist of the Washington Experiment Station early in 1949, has led to some revolutionary practices in poultry and animal feeding. The Washington scientist, in search of an unidentified growth factor present in a fermentation vitamin B<sub>12</sub> supplement, learned that the factor was actually the antibiotic, aureomycin. Since his original discovery, many experiments at other stations and in the Department have been reported on the relative values of a number of different antibiotics. This research has been carried over to swine and calf feeding. It is establishing the relative values and safe loads of antibiotics that can be added to rations and promote growth without injury to animals or to humans eating the animal products. In the first half of 1951 the New York State Department of Agriculture and Markets reported that 84 percent of the commercial broiler rations in that State contained antibiotics. Similar extensive use is reported from many different areas.
4. Dried Skim Milk Treatment of Soils. Research conducted at the Montana Experiment Station points to new uses for low-cost milk products, such as dried skim milk. Soils inoculated with skim milk resulted in plants with larger, more fibrous root systems, larger and taller stems, greater leaf areas, and increased early and total yields. The skim milk brought beneficial changes in the chemical composition of the soil and in soil microbiological activity. Many commercial florists in Montana are now using skim milk as routine treatment for high value horticultural crop soils.
5. Brush Control Increases Range Capacity. In experiments conducted cooperatively by the Oklahoma station and the Department at Woodward, Oklahoma, controlling sagebrush on range by mowing or by chemical sprays has been found profitable. This practice and withholding grazing during two successive summers encouraged growth of desirable grasses and raised the 8-year average returns above costs from \$5.07 to \$8.11 per acre.
6. Cotton Yields Increased by Contouring and Terracing. Water conservation studies conducted by the Texas Experiment Station from 1927 to 1950 showed 24 percent increases in yields of cotton by contouring and 57 percent increases by contouring and terracing. The annual increased returns in terms of lint and seed at local market prices has been \$6.59 per acre for contouring and \$15.46 per acre for contouring and terracing over returns obtained with straight row farming.
7. New Bacterin Prevents Chronic Pneumonia in Calves. Although antibiotics and sulfa drugs are helpful in treating acute pneumonia, they will not prevent the chronic type affecting dairy calves in certain sections of the country. The South Carolina station, in studying calves that had died from chronic pneumonia, found three organisms which seemed to be the principal offenders. Extracts prepared from these three organisms turned out to be satisfactory preventives if administered early enough. One dairyman, who had lost over \$100,000 worth of calves in five years from chronic pneumonia, reports no losses since using this new preventive on his calves.

8. Improved Insecticides Kill Flies. The New Hampshire station has developed several formulas in which certain chemicals act as "synergists" that increase the insect killing power of nicotine, rotenone, and pyrethrum. The resulting compounds are of considerable current interest because they are classified as among the "safer" insecticides and also because in recent years houseflies and some other insects have become resistant to chlorinated compounds such as DDT. To date no houseflies have been found that are resistant to pyrethrum. The chemicals used in making the New Hampshire compounds increased insecticidal fatalities even when added in very small amounts.
9. Milk Vending Machines Offer New Market. The Wisconsin Experiment Station has shown in a marketing study that producers of fluid milk could find an expanded market by making wider use of milk vending machines which would be similar to machines used for automatic purchase of soft drinks, candy, and cigarettes. Because milk is perishable, special refrigerating devices would be necessary. The Wisconsin study conservatively estimates that 945 million half-pint containers of milk could be sold yearly. Sales through automatic vending machines could create a new outlet for an estimated half a million pounds of milk annually.
10. Vitamin C Destroying Factor Discovered in Tomatoes. A fundamental discovery made by biochemists of the New Hampshire station reveals that the small green colored Peruvian tomato used by plant breeders as parent in crossing garden varieties in developing high vitamin C content tomatoes, also carries an enzyme that may destroy vitamin C under certain conditions. Destruction takes place when the tomato is chopped, sliced, or macerated without first applying heat as in stewing or canning. This discovery may have implications in considering future crosses of tomato varieties, in the processing of tomatoes, and in teaching nutrition.
11. Breeding for Resistance to Corn Borer. Plant breeders in the Corn Belt States are gradually developing varieties of corn that are showing increasing resistance to the corn borer. The Ohio Experiment Station reports a new variety, Ohio 54, which is showing particular promise along these lines. Seed of this variety has been distributed to other experiment stations and 500 acres sown in Ohio in 1951, promises a supply of seed for 100,000 acres in 1952.
12. Avoiding Losses in Marketing Peaches. Marketing specialists of the New Jersey Experiment Station, carrying on supervised studies in south Jersey peach orchards, shed some light on the amount of money being lost by bruising. Some growers lose up to \$40 an acre in some years from bruises. During the two years of the study, the research men learned that about 10 percent of the peaches harvested were bruised in picking, grading, packing, and shipping. Damaged fruit ranged from almost none on some farms to more than 15 percent on others. On the basis of the study, peach growers in New Jersey are now being urged to follow a ten-point program to avoid bruising and money losses.



13. New Northwest Hog Developed. A bacon-type hog suitable to the feed and climatic conditions of the State of Washington is being developed by the Washington station from an original cross of USDA Danish Landrace boars on Chester White sows. The new strain excels in size of litter, livability, growth rate, economy of gain and type score. Carcass cutouts reveal a higher percentage of primal cuts and about 25 percent less lard.
14. Gypsum Does Not Displace Potash on Calcareous Soils. Arizona farmers planning the use of gypsum as a soil corrective of alkali soils need not fear any loss of reserve potash, according to an important research finding at the Arizona Experiment Station. Prior to the Arizona experiments there had been some concern that the frequent use of gypsum might displace some of the potash which would be lost in drainage of the irrigation waters. The experiments showed that such a loss does not occur in calcareous soils.
15. Improved Strain of Cigar Tobacco. About 95 percent of the Havana Seed tobacco now grown in the Connecticut Valley is made up of the more productive and higher quality strains developed by plant breeders at the Massachusetts Experiment Station. Yields per acre now average more than 1,700 pounds, over 300 pounds above yields obtained before the new kinds were released to growers. The annual increase in value to tobacco growers as a result of this research is estimated at one million dollars.
16. New Planting Method Increases Corn Yields. Extensive trials conducted by the Minnesota Experiment Station on different soil types have shown that Minnesota farmers can double the number of corn plants per acre over usual practice by applying 100 pounds of fertilizer. Increasing the planting and adding fertilizer brought over 15 bushels higher yield of corn per acre. On fertile soil not fertilized, doubling the number of plants brought an increase of only 6 bushels per acre.
17. Discovery Lowers Tobacco Production Costs. In a test of growth regulators for prevention of sucker growth on tobacco plants, the North Carolina station found that the mineral oil carrier alone was just as effective as any of the growth hormones. The oil can be applied to the top of the stalk when it is topped. A clipper has been developed which removes the top and applies the oil all in one operation. Compared with the usual method of topping and suckering, tobacco growers may be able to save up to \$10 an acre by using this new method.



# Regional Research Fund

For the conduct of research in which two or more State agricultural experiment stations are cooperating to solve problems that concern the agriculture of more than one State, there is available the "Regional Research Fund" authorized by Section 9(b)3 of the Research and Marketing Act. This fund consists of not more than 25 percent of the amount appropriated under Section 9 of the Act. Allotments are made to stations on the basis of projects recommended by the Committee of Nine established by the Act to represent the State stations.

The following table indicates the distribution of the Regional Research Fund by subject matter:

Table D --Distribution of Regional Research Fund by Subject Matter

	<u>1951</u>	<u>1952</u>
<u>Marketing Research</u>		
Cotton .....	\$ 29,000	\$ 29,000
Fruits and Vegetables .....	75,100	73,400
Livestock and Wool .....	66,088	78,600
Milk and Dairy Products .....	60,829	64,389
Potatoes .....	48,900	45,850
Poultry and Eggs .....	91,262	82,100
Other .....	5,264	6,800
Total Marketing Research .....	376,443	380,139
<u>Non-Marketing Research</u>		
Beef Cattle Breeding .....	120,461	122,500
Cotton Improvement and Mechanization .....	116,185	117,000
Dairy Cattle Breeding and Sterility .....	91,242	91,500
Diseases and Parasites-Animal & Poultry ....	44,775	44,300
Farm Buildings .....	42,900	30,500
Farm Housing .....	111,450	111,450
Foods and Human Nutrition .....	168,856	169,700
Introduction of New Plants .....	76,000	74,700
Pasture and Forage Crop Improvement .....	24,368	24,550
Poultry Breeding .....	38,815	38,300
Soil Management .....	21,344	26,261
Other .....	11,161	12,700
Total Non-Marketing Research .....	867,557	863,461
Travel by Committee of Nine .....	6,000	6,400
Total, Regional Research Fund .....	<u>1,250,000</u>	<u>1,250,000</u>

In addition to the Regional Research Fund, substantial amounts of other Federal-grant funds and funds of non-Federal origin are being expended in furtherance of regional research projects.

Examples of Research Results From Regional Research Projects

1. Studies on Causes and Prevention of Reproductive Failures in Dairy Cattle. About 10 percent of all cows culled from dairy herd improvement associations leave the herd because they have stopped breeding. (Florida reports 12.5 percent). Failure of dairy cattle to breed regularly costs U. S. dairymen millions of dollars every year. The extreme seriousness of this situation has led to the development of a well coordinated attack on the many different phases of the problem by a number of the State experiment stations and the Department bureaus. The work is organized under two regional projects.

New diseases are being studied.

In a recent survey by the New York Station, vibrio foetus, a disease that frequently causes abortion (not to be confused with Bang's disease) is the chief disease affecting reproductive efficiency of cattle. The Vermont Experiment Station scientists find that cows which have been exposed to vibrio for some time gradually develop an immunity but heifers, even when raised in a diseased herd, seldom breed normally at first. Vaginitis, another widespread disease among dairy cattle, is not a major cause of sterility according to studies conducted by the Rhode Island station. The Pennsylvania station slaughtered a large group of heifers that failed to conceive. Eleven percent showed genital abnormalities. In the remaining 89 percent, no one type of bacteria seemed responsible for the sterility encountered.

Since artificial breeding has become widespread, many States are studying methods of improving the viability of semen.

The Pennsylvania, New York, New Jersey, and other experiment stations were able to show that semen from bulls with a poor breeding record could be materially improved by adding an antibiotic like penicillin, streptomycin, or aureomycin to the diluted semen. As a result of this discovery probably half of the artificial breeding associations in the country are now adding antibiotics to the semen of high index bulls (bulls able to transmit high milk production to offspring) whose semen shows low viability. Antibiotics have not improved the semen of bulls with natural high viability.

Thyroprotein has been found to stimulate milk production when fed to dairy cows at the proper time and in carefully regulated amounts. The Nebraska Experiment Station tried adding thyroprotein to semen and found it behaved much as the antibiotics, that is, it increased the viability of the semen from poor breeding bulls but not the semen of highly fertile bulls.

Part of the trouble may be nutritional.

The New York station has discovered that heifers which are underfed require about five months longer to become sexually mature than well fed heifers. The Idaho station has been conducting investigations to determine if a low vitamin A ration was largely responsible for breeding troubles in the Northwest. To date the results indicate that the vitamin A (and carotene) content of the ration must be exceedingly low if cows



or bulls fail to breed as a result of vitamin A deficiency. These findings have been confirmed by research studies conducted at the Washington, Oregon, and West Virginia stations. The West Virginia station found that vitamin C (contrary to earlier reports) does not improve fertility.

Shy breeding (low fertility) probably not genetic in origin.

In research studies at the New Jersey station it was found that heredity has little influence upon over-all breeding efficiency. They found no significant difference between cow families or between progeny of different bulls in breeding efficiency. The New York station did find a slight effect, between breeding efficiency of dams and daughters.

2. Progress in Cotton Improvement. In 1948, when the regional research program for the improvement of cotton was started, the Texas Experiment Station was selected by the 11 cooperating States as headquarters for fundamental genetic studies directed to the possibility of finding desired characters in wild cottons and transferring them to American upland stocks. In meeting this responsibility the Texas station greatly expanded its facilities by constructing a new laboratory and greenhouses costing \$52,000 and built up a staff of 5 full-time research workers and several assistants. It developed a long-time program of research, in cooperation with the Department, based on the premise that any major future improvements in cotton plants are dependent upon the discovery of new sources of germ plasm and learning how to use them in breeding programs. Further major improvements through selection within cultivated varieties were not considered promising.

Accordingly, wild cottons from over the world, many primitive types from Central America and southern Mexico, and important and difficult-to-obtain hybrids, have been assembled and are being grown at the Texas station. Although 4 years is a short period in such an undertaking, dividends are already beginning to accrue. A large volume of information on the genetic constitution and special properties of the assembled material has been acquired through painstaking research. By developing new techniques, 18 of the 20 recognized wild and cultivated species have now been brought into one or more hybrid combinations, and knowledge of how to transmit their desirable qualities to commercial types has been obtained. As a first result of direct public benefit, breeding lines with high fiber strength and resistance to wilt and nematodes have been supplied to cotton breeders. Details of benefit to the advancement of the science of genetics and research workers in cotton breeding have been made available in a number of publications, 18 within the past year. The potentials for high yield, resistance to insect pests, drought and cold resistance, specialized fiber properties, and better boll and plant types for mechanical harvesting that exist among the wide variety of plant material being studied will eventually be isolated and brought into breeding programs. The welfare of American cotton in competition with foreign cottons and synthetic fibers will benefit greatly through these efforts.



3. Vegetable Marketing Studies Point to Benefits for Growers and Retailers. Cooperative research in the marketing of vegetables in the northeastern region is carried on under several phases with certain State experiment stations and the cooperating Department agencies having responsibility for one or more phases. Thus, the Maryland Station and the Production and Marketing Administration are cooperating in developing ways of measuring the quality factors that are involved in market grades and standards. Several ingenious new instruments have been devised to carry out various measurements, such as the shear-press which measures tenderness of peas and lima beans, fiber content of asparagus and snap beans, and succulence of sweet corn, sweetpotatoes, and white potatoes. Precise and rapid measurements of color can be made with the Hunter-color-difference meter, and tentative quality grades based on this instrument have been established for tomatoes and tomato juice. Its probable value for color in peas, lima beans, snap beans, sweetpotatoes, and cantaloupes is indicated. Work with the shear-press has been carried out with the Food and Drug Administration and the National Association of Food Packers in anticipation of establishing quality standards.

Research by the Cornell University experiment station has opened up possible leads for rapid determination of flavor in vegetables. The Cornell station has also studied the merchandising methods used in vegetable sales by 230 retail food stores in Syracuse, New York, with more intensive study of 40 stores. Publication of results is expected soon. The data should provide much helpful information on such factors as costs of retailing vegetables, value of displays, effect on sales of different methods of refrigeration and trimming, relation of price to volume of sales, and effect of purchase policies. Among the findings so far reported is that the fruit and vegetable departments of both chain and independent stores are the most expensive to operate; about 44 percent of the time is spent in receiving, preparing, and setting up displays of produce. Value of sales per hour of labor was \$8.70 for vegetables, \$11.90 for meats, and \$17.40 for groceries. The use of refrigerated cases increased sales, and higher sales were reported where the displays were sprinkled with water.

Vegetable growers of the Northeast are vitally concerned with an ever-expanding outlet for their products through retail stores. This study will benefit both growers and retailers in helping to point out problems of retailing, ways of increasing sales, and the volume and variety of vegetables that can be handled profitably and efficiently.

4. Cooperative Nutritional Status Research in the North Central Region. Eleven States in the North Central Region and the Department are cooperating in a program of research, initiated in 1947, to determine the nutritional status and dietary needs of older women and school children.

The study of women in the decades from 30 through 90 has involved (1) a background survey of food consumption habits, (2) quantitative study of food intake of selected subjects and their nutritional status as portrayed by various biochemical and physiological measurements, and (3) exacting metabolism studies on relatively fewer subjects to determine whether they were in "balance" with regard to the individual nutrients supplied by the food consumed. The Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, South Dakota, and Wisconsin stations have cooperated in this phase of the research.



Records obtained showed that the food habits of the women were different in the various age groups, with a tendency toward fewer calories and less carbohydrates, protein, calcium and thiamine with advancing age. As evaluated by present standards many of the diets did not measure up to adequacy in all the Basic Seven foods. Data obtained on nutrient intake and outgo suggest that supplies of calcium, ascorbic acid, and riboflavin are frequently inadequate in the diets and that protein intake may be inadequate, not only in quantity but also in quality. Deficiency of methionine, one of the essential amino acids, was most frequently the limiting factor in the quality of the proteins consumed. Of particular interest was the observation throughout the region that calorie intakes were considerably lower than presently accepted standards, and yet the women were in good health and were not underweight. This general observation has prompted plans, in continuation of the research, to re-evaluate human caloric requirements.

In the regional research on the nutritional status of school children, particular attention was directed to the school lunch as an influencing factor. The Iowa, Kansas, and Ohio stations cooperated in this investigation.

The Iowa station points out, that among the children studied, breakfasts were predominantly poor and that food habits were poor in regard to the consumption of the protective foods, namely, milk, green and yellow vegetables, and vitamin C containing foods. These defects were reflected in tooth decay and in low blood values for vitamin A, carotene and ascorbic acid. Hemoglobin values, however, were normal. The Ohio station study brought out the interesting fact that children living in Ohio cities used a higher variety of food groups and consumed more milk than children living in rural areas. The joint findings of the regional program suggest the need for a controlled study to show what improved nutrition could accomplish for the school child, and what the school lunch could contribute to the improved nutrition. This will be started next year.

5. Frozen Food Lockers and Home Freezers in Meat Distribution. Regional research in which the State experiment stations of Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, South Dakota, and the Department participated was conducted to appraise the position of frozen food locker plants and freezers in the over-all pattern of livestock and meat marketing. The study was based on conditions in 1947 and data were obtained from 576 frozen food locker plants, 3,947 patrons who rented lockers, and 2,156 users of home freezers. This study has been completed and the results published. It is estimated that 622 million pounds of red meat was processed during the year by all locker plants in the States included in this study. Processing of poultry was less extensive than that of red meats. Approximately 86 percent of the meat stored was produced from local slaughter, 12 percent consisted of carcasses and parts of carcasses purchased as wholesale cuts of meat, and 2 percent was cut and wrapped by the patrons before delivery to the plant. Three-fifths of the plants sold wholesale, 90 percent of which went to locker renters. Of the 2,156 home freezer owners who furnished information for the study, 69 percent resided on farms, 31 percent in towns. Farm owners of home freezers reported storing 804 pounds and city owners 355 pounds of meat, poultry, fish, and game in their units, contrasted with 304 pounds of meat stored per locker in all plants taken into consideration. Locker

renters reported that family meat consumption increased, especially that of beef, since renting the lockers. In a period of rapidly expanding use of the home freezer and continued extensive use of commercial food lockers, these data are highly significant in arriving at a clear understanding as to the influence of such frozen storage on traditional food distribution activities.

6. Consumer Pattern for Citrus Fruits. The Florida and Texas stations and the Department are cooperating in a regional study on the consumer pattern for citrus fruits which includes a phase of work on consumer preference and buying behavior on selected markets. Information is being obtained from retailers as well as consumers. Results to date show that consumers are more sensitive to changes in quality of citrus products than to changes in prices. They make a distinction in their evaluation of the various citrus products, the primary distinction being between fresh citrus and processed citrus juices, with a wide preference for fresh fruit over the processed juices. This preference did not vary greatly among low, medium, and high income areas. It was also learned that frozen orange concentrate is preferred over canned citrus juice by those who have used both products. However, it was found that consumer income seems to affect sales as stores located in high income areas sell a much greater volume of frozen orange concentrate than is the case of stores located in low income areas. The reverse sales relationship exists when applied to orangeade. While studies are being continued to give coverage in a significant number of representative population centers, these data are finding application in the pattern of citrus distribution and in volume going into various processed products.

Another significant application of findings from these cooperative citrus marketing studies occurred recently. The most disastrous freeze in the history of the Texas citrus industry during the period January 29 through February 3, 1951, necessitated radical departures from normal handling and operating procedures in marketing the crop. Research at the Texas station under a regional research fund project, in cooperation with the Department, furnished data which enabled the Office of Price Stabilization to issue a supplementary regulation providing for an upward adjustment in Texas citrus juice ceiling prices by exactly the same amounts that the Texas cost study revealed. This increase provided the growers and canners with more than one-half million dollars which aided greatly in relieving in part the financial crisis which confronted the Texas citrus industry.



(b) Salaries and Expenses, Office of Experiment Stations,  
Agricultural Research Administration

Appropriation Act, 1952 .....	\$367,090
Anticipated pay adjustment supplemental .....	+23,000
Base for 1953 .....	390,090
Budget Estimate, 1953 .....	389,000
Decrease (due to partial absorption of pay adjustment costs) .....	<u>-1,090</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	Decrease (Pay adjustment absorption)	1953 (estimated)
Salaries and Expenses, Office of Experiment Stations, Agricultural Research Admin- istration:				
a. Administration and coordin- ation of research with States .....	\$228,222:	\$229,900:	- -:	\$229,900
b. Federal Experiment Station, Puerto Rico .....	171,304:	160,190:	-\$1,090:	159,100
Subtotal .....	399,526:	390,090:	-1,090:	389,000
Unobligated balance .....	7,974:	- -:	- -:	- -
Total pay adjustment costs ....	[ - - ]:	[ 24,125 ]:	[ -80 ]:	[ 24,045 ]
Total available or estimate ...	407,500:	390,090:	-1,090:	389,000
Reduction pursuant to Sec. 1214 :	+5,000:	- -:		
Anticipated pay adjustment supplemental .....	- -:	-23,000:		
Total appropriation or estimate :	412,500:	367,090:		



## STATUS OF PROGRAM

General: The Office of Experiment Stations (a) administers the Federal-grant acts involving support of the State, Territorial, and Puerto Rico agricultural experiment stations, and (b) operates the Federal Experiment Station in Puerto Rico.

Administration and Coordination of Research: Except for the Regional Research Fund, the payments to States are made directly to each station at the beginning of each quarter of the fiscal year according to formulas prescribed by the authorizing acts. The director of each station has the responsibility of determining the program of research to be undertaken through use of these funds. In this way prompt and close range attention to the most urgent local agricultural problems is assured since the determination of program needs is made in the States. However, to assure proper coordination and to prevent duplication of effort, each individual line of research conducted wholly or in part through use of these payments to States must be approved by the Office of Experiment Stations in advance of any expenditure of funds. The principal steps involved in the administration of these grants by the Office of Experiment Stations are:

1. Examination and approval of individual lines of research submitted by the agricultural experiment stations for support under the several funds. This examination is made to ascertain that the proposed research is in conformity with the terms of the enabling legislation and that it is adequately financed, properly staffed, and effectively coordinated with similar research at other experiment stations and in the Department of Agriculture.
2. Approval of an annual program of work submitted by each station at the beginning of each fiscal year, with a tentative allocation of funds to each line of research included in the program. Subject to approval by the Office of Experiment Stations, necessary modifications both as to subject matter and allotment of funds to projects may be made within the fiscal year.
3. Annual examination at each experiment station by members of the technical staff of the Office of Experiment Stations to determine whether the station is complying with the terms and provisions of the several acts. This involves a review of progress on each individual line of research and an examination of the accounts to ascertain that the moneys are used for appropriate purposes. On the basis of such annual examination, the Office certifies each experiment station as to its continuing eligibility to receive funds appropriated for payments to States.



4. Requiring of each experiment station after the close of the fiscal year a sworn financial statement indicating the use of the funds during the year.
5. Preparation of an annual report to Congress covering the work and expenditures of the agricultural experiment stations.

In addition to the specific steps enumerated above regarding administration of these funds, the Office of Experiment Stations through its staff of research specialists carries on numerous activities pertaining to most effective use of these Federal grants for research. These include the maintenance of extensive project records, not only regarding the research financed by these Federal grants but also the extensive and closely related programs of research in the experiment stations supported by non-Federal funds; the analysis and dissemination of information on current research activities; review of accomplishments in selected lines of work; participation in research planning conferences, particularly with reference to the organization and planning of regional research projects. These specialists also function extensively in a liaison capacity between State agricultural experiment stations and research agencies of the Department with reference to the development of cooperative research between State and Federal agencies.

Federal Experiment Station in Puerto Rico: The research investigations of the Federal Experiment Station in Puerto Rico fall into two broad categories (1) those dealing with crops of strategic importance to the United States and (2) research on crops of value to the southern United States, conducted largely in cooperation with the other research agencies of the Department.

The Government of Puerto Rico has continued to supplement the research of the Federal station by a small annual appropriation for cooperative research on local agricultural problems. This program has been concerned particularly with such crops as vanilla, bay, and spices.

The station program is divided into major lines of work as follows:

1. Insecticidal crop investigations (rotenone).
2. Drug crop investigations (particularly quinine).
3. Food crop investigations.
4. Plant introduction and propagation.
5. Control of insect pests and plant diseases, by introduction of natural enemies and other means.
6. Weed control investigations.
7. Forage crop investigations.
8. Investigations on crops of local importance in cooperation with the Government of Puerto Rico and other agencies.

Selected Examples of Recent Progress:

1. Plant introductions of particular interest at this time were 15 species and varieties of Strophanthus, a possible source of the drug Cortisone. The Strophanthus seedlings were grown by the Bureau of Plant Industry, Soils, and Agricultural Engineering at Glenn Dale, Maryland, from seed collected by an expedition which the U. S. Public Health Service sent to Africa. As part of a cooperative plan, the plants were sent to the Federal Experiment Station in Puerto Rico for development, since Strophanthus is a plant requiring tropical conditions, after which they will be subject to critical test for their value as a basic material for Cortisone production. Several pounds of seed of Macadamia terpifolia, a promising nut crop, 2 strains of black pepper, Piper nigrum L., a tropical crop in short supply, and 1 plant of Melocanna baccifera, an edible bamboo, were among the introductions received for propagation and testing. The new plant introductions for the year totaling 190, included promising forage crops, both legume and grasses.
2. During the past year, the representative forage areas of the Island were surveyed to determine the prevalence of disease on the common and commercial forage crops. Specimens illustrating the diseases encountered were collected and preserved. Identifications of the pathogenic organisms were made through cooperation with the Division of Mycology and Disease Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering. Photomicrographs of the spore types as well as close-up photographs of the disease lesions have been made. Diseases of minor importance were also included. Early publication of this material for use in the identification of these forage diseases promises to be of real value to agriculturists, extension, and research workers in the identification and control of these diseases. No comparable research publication has been issued previously for Puerto Rico.
3. A technique has been developed which is proving practical for the preliminary screening of chemical weed killers. It is desirable to test new chemicals or herbicides under field conditions, as results of greenhouse and laboratory tests are not always conclusive. A method has been developed which permits a measurement of partial kill under field conditions, which is important in giving the investigator leads for further experimentation.
4. The greatest detriment to an expanding profitable vanilla production in Puerto Rico is the severe damage from root rot diseases. A technique for inoculation of vanilla with root rot was developed and used to test the comparative disease reaction of four species of vanilla. Under the conditions of this experiment, commercial vanilla exhibited no resistance to root rot. V. phaeantha, a non-commercial species, has good resistance to the disease. While the root tip of this species became infected, the disease was arrested and new uninfected branch roots had developed from the original root. Throughout the experiment, these plants remained dark green, turgid, and appeared healthy. This test further strengthens the field observations of the resistance of this species and points to its use in a breeding program.



5. A series of fundamental investigations was conducted to determine the effect of four controlled temperatures on the respiration of Derris roots and their rotenone and carbohydrate content. The roots of the plants were maintained at 60°, 70°, 80°, and 90°F., respectively; the tops of all the plants were subject to the same greenhouse temperature. These treatments were maintained over a 3-year period. The plants were subirrigated with nutrient solution as frequently as needed to meet the moisture requirements. Considerable basic information on root respiration and methodology was obtained. The data showed that there was a decrease in insecticidal constituents with decreasing temperatures although only the roots were subject to temperature differences and the tops were apparently normal. This is in agreement with the hypothesis that the roots are the principal organ of rotenone synthesis.
6. Although the chemical 2,4-D is now widely used as a herbicide for controlling broadleaf weeds, there is little or no published information as to how or why this compound produces its effects on plants. A series of experiments was initiated to determine the effect of 2,4-D on the photosynthetic activity of leaves using the velvet bean as a test plant. The data obtained in these experiments show clearly that 2,4-D lowers the rate of photosynthesis of susceptible plants. The decreases in the rate of photosynthesis occurred before any outward signs of injury appeared. The data also show that the degree of depression is proportional to the amount of concentration of 2,4-D applied and is correlated with the severity of injury to the tissues. Such information on the response of plants to given compounds is basic to developing more effective compounds.
7. During the course of the year, an experiment was set up to determine the relative palatability of a group of 10 different legumes. These were selected from introduction trials on the basis of their ability to grow vigorously, and little was known of their properties as forage crops. Preliminary results place trailing indigo in a very favorable light. This species ranked first in production and in all criteria of palatability. The two varieties of tropical kudzu, one hairy - the other hairless, on which the station has done considerable work ranked fourth and seventh in production, fourth and seventh in the amount consumed, fifth and sixth in percentage consumed, seventh and eighth in total time grazed, and third and fourth in order of preference, among the 10 species tested.



(c) Virgin Islands Agricultural Program, Office of  
Experiment Stations, Agricultural Research  
Administration

Appropriation Act, 1952 .....	- -
Budget estimate, 1953 .....	\$100,000
Increase (to establish and operate an agricultural program in the Virgin Islands as provided by Public Law 228, 82nd Congress, for the improvement of agriculture in the Virgin Islands) .....	<u>+100,000</u>

PROJECT STATEMENT

Project	: 1951	: 1952	: Increase	: 1953
	:	:(estimated):	:	:(estimated)
1. Virgin Islands Agricultural	:	:	:	:
Program .....	- -	- -	+\$100,000:	\$100,000
Total pay adjustment costs .....	[ - - ]:	[ - - ]:	[+6,500]:	[ 6,500]
Total appropriation or estimate ...	- -	- -	:+100,000(1):	100,000

INCREASE

(1) An increase of \$100,000 to establish and operate an agricultural program in the Virgin Islands as provided by Public Law 228, 82nd Congress, for the improvement of agriculture in the Islands.

Historical Background: The Virgin Islands, which the United States purchased from Denmark in 1917, are a group of three small islands lying about 50 miles east of Puerto Rico. The Department of Agriculture operated a small research station in the islands from that date until 1932 when research work was discontinued and the station was transferred to the jurisdiction of the Department of the Interior. Since 1932 this station has served the islands chiefly as a service organization through conduct of inspection activities, veterinary services, distribution of seeds and fertilizers, loan of farming equipment, etc. No research and very little extension type activity has been conducted.

Need for Work: Lying entirely within the Tropics, these islands have a climate which differs greatly from the conditions found within the continental United States. Also, certain climatic factors particularly rainfall and soils, differ widely from those found in Puerto Rico. Whereas most of Puerto Rico enjoys an abundance of rainfall, proper distribution of water throughout the year and holding quality of the land are the main conditions limiting agriculture in the Virgin Islands. Likewise most Puerto Rican soils are of heavy clay types whereas much of the Virgin Islands soil is light and porous in nature. For these reasons, research conducted elsewhere has only limited application to the Virgin Islands.

The cultural background of the islands also differs greatly from that found elsewhere. Although negroes form the bulk of the population, there is a closely knit minority of French in St. Thomas, another sizable minority of Puerto Ricans, as well as persons of Danish and American backgrounds. Each of the groups has maintained much of its cultural background, including differences in language, which increases the difficulty of operating an effective agricultural program. Also, the slave background of the native population has resulted in a feeling that working in the fields is degrading. Great benefits can result from extension activities to improve farming methods, improve rural life, and to raise nutritional standards.

The agricultural industry has declined steadily in the Virgin Islands for a number of years because of competition from other areas and also from failure to develop and use improved agricultural practices. By the passage of Public Law 228 the Congress recognized the need for an aggressive agricultural program in the Virgin Islands through the development of factual information from research and through the transmission of this information to the rural public of the islands by extension methods.

The foremost problem to be undertaken is that of water conservation. Rainfall varies greatly from a minimum of 20 inches to a maximum of 75 inches per year with an average of about 47 inches. However, the Virgin Islands have definite dry and rainy seasons each year so that much of this rainfall is concentrated in a limited period. Also much of the water is lost through rapid runoff into the sea and through evaporation.

Although cisterns have been used to store water, the drilling of many wells has lowered the water table rapidly. In a year of limited rainfall, this may result in serious drought conditions unless prompt remedial action is taken.

Closely associated with the problem of water conservation is the need for the development of improved pasture plants which will conserve soil and moisture while at the same time providing nutritious feed for livestock. Likewise, systematic research is needed in forest and range management. Research along these lines should do much to improve the agriculture of the islands through better use of limited water supplies.

Research on sugar also is needed. At the present time sugarcane is the only revenue-producing crop of any importance and sugarcane operations are now being conducted at a heavy loss. Investigations are needed on introduction and breeding of new varieties which are better adapted to the local conditions, on improved management practices, and on better use of fertilizers, herbicides, and improved agronomic methods.

While major research emphasis is needed on the above problems, research on additional problems would be conducted to the extent that funds permitted. For example, a limited program of plant introduction is



considered essential not only in connection with pasture and sugar investigations, but also in order to determine whether other crops such as mangoes and avocados have commercial possibilities.

Marketing, in the fields of both fruits and vegetables and livestock, presents serious problems which, if solved, would do much toward changing and improving the economic picture in the islands rapidly. There is also a need for reliable information on desirable farm enterprises and combinations of enterprises for more efficient farming. A limited amount of work in these fields is contemplated.

Plan of Action: An agricultural program involving both research and extension activities is contemplated. Headquarters for this program would be established on the island of St. Croix since this island offers the greatest possibilities for agricultural development. However, it is planned that the needs of the islands of St. Thomas and St. John would be served by the station in St. Croix.

Present plans call for the recruitment of a small number of professionally trained employees, who would perform both research and extension activities. In this way, fairly adequate coverage of the various fields of agricultural science requiring immediate research attention can be secured. At the same time, this small group of specialists can assist rural and farm families in meeting a wide variety of problems in such areas as agricultural production, marketing, nutrition, home food production, home improvement, and the like.

Because of the number and diversity of the marketing problems, it is believed desirable that specialists of the Bureau of Agricultural Economics be secured through short term details to undertake the needed research rather than to attempt to employ permanent staff for this purpose.

The initial research program would be concerned primarily with testing and demonstration to determine accurately the long range needs and to attack as quickly as possible some of the more urgent problems including water conservation and development of suitable crop and range plants.

Also attention would be directed toward assisting rural and farm families in increasing the quantity, variety, and quality of home produced foods through improved and expanded gardening and the production of poultry and livestock for home use. Assistance would be given on improvement of pastures and the production of livestock feeds. Much needs to be done to introduce the use of commercial fertilizers, to encourage soil conservation, to improve sugar production practices, and to introduce the use of small machine operations into farming instead of almost complete reliance on hand methods.



Cooperation with the Virgin Islands Corporation: This estimate is based upon the operating needs of an agricultural program for the Virgin Islands; it includes no funds for land or buildings needed to carry out the program. Furthermore, the estimate does not contemplate conduct of any of the service type activities performed by the present agricultural station. The present agricultural station is located in an area unsuited to agricultural research and the old frame buildings are in a badly run down condition. It is understood that the Virgin Islands Corporation will make available a small area of good agricultural land for use in conducting experimental work and that it will also provide a small building for office and laboratory use as well as residences for members of the technical staff conducting the agricultural program. Adequate housing is essential if a competent staff is to be secured and retained.

CHANGE IN LANGUAGE

The estimates include proposed changes in language as follows (new language underscored, deleted matter enclosed in brackets):

For expenses necessary to carry out an agricultural program  
in the Virgin Islands in accordance with the provisions of  
Public Law 228, approved October 29, 1951, including the  
purchase of one passenger motor vehicle, \$100,000.

This new language is proposed in order to carry into effect the agricultural program for the Virgin Islands authorized by Public Law 228, approved October 29, 1951.





STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

Item	: Obligations, 1951	: Estimated obligations, 1952	: Estimated obligations, 1953
<u>Agricultural Marketing Act (RMA-Title II), Agriculture (Office of Experiment Stations):</u>			
Marketing research and service	\$309,345	\$253,400	\$277,400
<u>Working Fund, Agriculture, Agricultural Research Administration (Office of Experiment Stations), Advanced from Bureau of Plant Industry, Soils, and Agricultural Engineering:</u>			
For research on plants which may be sources for the drug Cortisone .....	- -	5,000	- -
<u>Miscellaneous Contributed Funds, Department of Agriculture (Office of Experiment Stations) (trust fund):</u>			
Cooperation with National Aluminate Corporation on research and tests of chemical materials used to control weeds, Federal Experiment Station, Puerto Rico .....	547	1,253	1,200
<u>Obligations under reimbursements from Governmental and other agencies:</u>			
Salaries and expenses:			
For research work at Federal Experiment Station, Puerto Rico .....	6,158	15,000	15,000
<b>TOTAL OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS .....</b>	<b>316,050</b>	<b>274,653</b>	<b>293,600</b>



## PASSENGER MOTOR VEHICLES

At the present time the Office of Experiment Stations operates only two passenger motor vehicles, both of which are located at the Federal Experiment Station, Mayaguez, Puerto Rico. The estimates contemplate the replacement of one of these vehicles during 1953 at a net cost of \$1,000. This vehicle will be more than six years old and will have traveled in excess of 60,000 miles at time of disposal. Because of poor roads and adverse climatic conditions in the area, it is necessary to trade in vehicles when they have reached this age. Experience has indicated that two passenger motor vehicles are necessary for proper operation of the Federal Experiment Station in Puerto Rico. The cars are required to enable technical staff members to conduct official business at experimental locations at several widely divergent places throughout the island.

In addition, the estimates contemplate the purchase of a new passenger motor vehicle for use in connection with the proposed new Virgin Islands Agricultural Program. Since public transportation in the rural areas is inadequate or non-existent, one passenger motor vehicle will be necessary to enable members of the staff on the Island of St. Croix to travel to various locations on the island in the conduct of the research and extension program.





BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS

Purpose Statement

The Bureau was established on July 1, 1923, absorbing the Office of Home Economics which had been in existence since 1915 as an enlargement of The Human Nutrition Investigations authorized by the Congress in 1894.

Research is carried on through laboratory and field studies in cooperation, wherever possible, with other bureaus of the Department, other Federal agencies, and with State research agencies, particularly State agricultural experiment stations. Studies include research on:

Food and nutrition, to determine the nutritive contributions of different foods to the diet, the comparative costs of foods, the food and nutritional requirements of people, and how these facts can be applied by families in differing circumstances to the buying of food, the preparation of healthful meals, and the preservation and care of food in the home.

Family economics, to determine the quantities of different foods and other goods and services consumed by families in various regional and economic groups; to evaluate the economy and nutritional adequacy of diets and to study the factors such as income, prices, and family size that affect family expenditures for living:

Textiles and clothing, to determine the relative usefulness and cost of fabrics and garments differing in material, construction, design, and finish, for the purpose of developing specifications for products that better meet consumer needs, and of assisting consumers in their selection and care of fabrics, garments, and household textiles for various uses.

Housing and household equipment, to determine the housing needs of families for efficiency and comfort as a basis for developing plans for rural houses and for adequate and efficient work and storage centers, and to assist families with the selection, care, and use of household equipment.

Laboratory work is performed at the Agricultural Research Center, Beltsville, Maryland, and at fifteen locations in cooperation with research institutions in the States. The staff employed on November 30, 1951, numbered 268, of whom 160 were located in the field.

	Estimated, <u>1952</u>	Budget Estimate, <u>1953</u>
Appropriated funds	\$1,436,000	\$1,430,000

Salaries and Expenses

Appropriation Act, 1952 .....	\$1,350,000
Anticipated pay adjustment supplemental .....	86,000
Base for 1953 .....	<u>1,436,000</u>
Budget Estimate, 1953 .....	<u>1,430,000</u>
Decrease (partial absorption of pay adjustment costs).....	<u>- 6,000</u>

PROJECT STATEMENT

	: 1951	: 1952	: Decrease (pay:	: 1953
	:	: (estimated)	: adjustment	: (estimated)
	:	:	: absorption)	:
1. Food and nutrition investi-	:	:	:	:
gations .....	\$703,319	\$591,400	-\$3,400	\$588,000
2. Family economics investiga-	:	:	:	:
tions .....	376,229	454,600	- 2,600	452,000
3. Textiles and clothing in-	:	:	:	:
vestigations .....	228,228	230,000	- -	230,000
4. Housing and household equip-	:	:	:	:
ment investigations .....	167,781	160,000	- -	160,000
Unobligated balance .....	+ 7,543	- -	- -	- -
Total pay adjustment costs .....	[ - - ]	[92,500]	[+ 200]	[92,700]
Total available or estimate ..	<u>1,483,100</u>	<u>1,436,000</u>	<u>- 6,000</u>	<u>1,430,000</u>
Transfer in 1952 estimates to	:	:	:	:
"Salaries and expenses, Office:	:	:	:	:
of Information, Agriculture" ..	+ 1,900	- -	:	:
Reduction pursuant to Sec. 1214:	+ 15,000	- -	:	:
Anticipated pay adjustment	:	:	:	:
supplemental .....	- -	-86,000	:	:
Total appropriation or estimate:	<u>1,500,000</u>	<u>1,350,000</u>	:	:



## STATUS OF PROGRAM

Current Activities: The research of the Bureau of Human Nutrition and Home Economics consists of both laboratory and field investigations, many under cooperative or contract arrangements with other research organizations. It includes:

1. Food and Nutrition: Determining the nutritional requirements of people; the composition and nutritive value of food to meet these needs; the best use of agricultural products, including food selection, care of food in the home, and the most suitable methods of home food preparation and preservation.

Current research includes studies of the requirements of normal individuals for selected nutrients; food intake in relation to nutritional status; the physiological availability of food energy, carotene, and ascorbic acid from selected foods; the distribution in foods of selected amino acids, fatty acids, folic acid, and other nutrients; improved methods of household preparation as related to food quality; development of recipes for effective home, school and other institutional use; and investigations of food spoilage organisms as related to food conservation.

2. Family Economics: Investigating problems of household buying, and the adequacy and relative economy of the food, clothing and other goods and services that are consumed by various population groups, particularly the major items of household expenditure which serve as indicators of farm family living standards.

Special emphasis is being given to studies of the living achieved by farm families and of factors affecting clothing utilization and food consumption and dietary adequacy of urban and rural families; periodic appraisal of the nutrient content of national food supplies; compilation of available data on the composition of foods as marketed and as prepared for eating; and development of guides for food management.

3. Textiles and Clothing: Emphasizing studies to assist homemakers with the selection, use and care of family clothing and to help producers in the development of fibers, fabrics and garments for specific consumer uses.

Research is in progress on technical problems pertaining to consumer use and quality of clothing and household textiles; serviceability in actual use of fabrics of known composition and construction; causes of deterioration of fabrics during use; and the relative efficiency of various household detergents in fabric reconditioning.

4. Housing and Household Equipment: Involving studies of the housing needs of families and development of plans for rural houses with efficient work areas, adequate storage space, and arrangements for satisfying family living; and research to improve the selection, care and use of household equipment.

Work under way includes cooperative work with the Bureau of Plant Industry, Soils, and Agricultural Engineering on the development of house plans for Regional Plan Exchange Services; preparation of interregional reports on housing needs of rural families; the determination of adequate space and other facilities for effective home food preservation and for clothing construction and repair; studies of the operating characteristics of home laundry equipment.

Selected Examples of Recent Progress. Following are examples of progress in these fields during the past year.

1. Adequacy of the American diet. Estimates of the nutritive value of the U. S. per capita food supply from 1909 to 1949 have been published. These provide a base for programs to improve American diets. Shown are such important facts as the long-term increase in the calcium content of the average diet resulting from the increase in milk consumption and the sharp upswing in iron, thiamine, riboflavin and niacin intake in the early 1940's when enrichment of grain products became effective. This information is used in program planning and appraisal by government agencies and other groups concerned with food production and distribution, and with nutrition education.
2. Group feeding in an emergency. A manuscript on group feeding in emergency situations requested by the National Security Resources Board, to be published by the Federal Civilian Defense Administration, was prepared for state and local civil defense workers responsible for feeding groups of uninjured persons during a short-time emergency resulting from disruption of utilities or evacuation of people. Based on the Bureau's research on quantity food service, it discusses supplies, menus, recipes, and food management.
3. Meat consumption by families. Variations in urban-family consumption of meat and interrelationships between consumption of meat and other foods were reported in the eleventh published commodity summary resulting from the Bureau's 1948-49 dietary surveys. These facts are helpful to officials responsible for planning food distribution, to market analysts studying the demand for meat and other products, and to home economists developing programs for better nutrition and food management. Other results of the survey have been issued in 15 additional publications providing comparable data for different cities and in 3 special reports--the most recent one is on the subject of seasonal patterns of food consumption.
4. Source materials for consumer educators. Bulletins on tomatoes and peaches are the first two of a series to supply information needed for consumer education in marketing programs. Topics summarized were nutritive value, seasonal supplies and other market information, food value for money spent in comparison with other foods, selection and use of different varieties, use in family meals, and home preservation.



5. Home freezing of foods. A handbook "Procedures for Home Freezing of Vegetables, Fruits and Prepared Foods" presents a comprehensive review of recent literature for the use of research workers and those responsible for disseminating such information. Topics included are: the preparation, pre-treatment, packaging, freezing, and storing of both raw and cooked foods and the thawing and heating of frozen pre-cooked foods for serving.
6. Cooking qualities of potatoes. Results of a study in cooperation with the Bureau of Plant Industry, Soils, and Agricultural Engineering show that early crop potatoes such as Triumph, Sebago, Irish Cobbler and White Rose, are all satisfactory for boiling and salad-making; and that Irish Cobbler and Sebago are better mashed than other varieties. None of the early potatoes studied made good baked potatoes or was satisfactory for French frying. Research is in progress on the cooking quality of late crop potatoes.
7. Children's energy requirements. Studies in cooperation with Columbia University show energy expenditures of boys and girls when resting (basal metabolism) to be the same per unit of body weight, and to differ but little when activities are sedentary. For more strenuous activities, average expenditure was consistently greater for boys. Compared with data on adults, energy expenditure per unit weight for children is greater, indicating higher food requirements, when performing identical tasks.
8. Disinfectants for use in household laundering. Increased use of new household laundering disinfectants, especially for infants' clothing and bedding prompted study of five compounds sold under various trade names for this purpose. Results showed that the recommended dilutions are not sufficiently effective.
9. Protein fiber deterioration by microorganisms. An organism of the genus Streptomyces was identified which destroys the strength of wool fabrics in a two-week period. Its action on a casein fiber used as mattress filling showed that the fiber was 89% destroyed in one week at 50° C and 88% in three weeks at 30° C, information pertinent to selection of mattresses which may become subject to mildew damage.
10. Household equipment. Family expenditure surveys in Kansas and Montana and summaries of farm family account books from a number of states show the continued importance of household equipment in the spending of farm families, particularly in areas recently provided with electric service. These findings have been used by the Extension Service in program planning and by other government officials and market analysts in estimating potential demand for such equipment.
11. Lighting facilities. A revision, in cooperation with the Bureau of Plant Industry, Soils, and Agricultural Engineering, of the bulletin "Electric Light for the Farmstead" presents principles basic to planning home and farm lighting to protect eyesight, to



make work easier and safer, and to contribute to farm productivity. Recommendations for lighting the house, yard, and farm buildings include suggestions for the selection, care, and upkeep of fixtures and lamps.

12. Home freezers. Studies to determine the effect of frost deposit in home freezers operating at 0° F show, contrary to popular belief, that frost accumulation even to a depth of one and one-half inches on evaporator liners does not cause a harmful temperature rise nor a significant increase in cost of operation. It reduces the usable space of the freezer, however -- sometimes as much as 10 percent -- and makes for inconvenience in use.
13. Adequacy of present farm refrigeration installations. A survey of approximately 160 farm refrigeration units furnished information, hitherto unavailable, on the adequacy of home-built farm refrigeration facilities now in use, and type and cost of installation, problems in construction, cost of operation, operating problems and family's habits of use. Facts thus obtained cooperatively with the Bureau of Plant Industry, Soils, and Agricultural Engineering, are providing basis for developing improved designs for such equipment.
14. Outlook Charts. Participation in the Outlook Conference, sponsored jointly by the U. S. Extension Service, Bureau of Agricultural Economics and Bureau of Human Nutrition and Home Economics is a major activity each year. This year, for the first time, the charts prepared for the conference were offered in film strip form, providing an inexpensive source of visual material for Extension workers, teachers and other group leaders. The film strip presented information on the situation of rural families in terms of population, income, prices, family spending, food, housing, and clothing.

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Agricultural Marketing Act (RMA-</u>			
<u>Title II), Agriculture (Bureau</u>			
<u>of Human Nutrition and Home</u>			
<u>Economics):</u>			
Marketing research and services	\$12,915:	\$8,700:	\$5,700
<u>National School Lunch Program,</u>			
<u>Production and Marketing Admin-</u>			
<u>istration (Bureau of Human Nutri-</u>			
<u>tion and Home Economics):</u>			
Nutritional requirements of			
school feeding programs .....	24,936:	27,175:	27,175
<u>Working Fund, Agriculture, Agri-</u>			
<u>cultural Research Administration</u>			
<u>(Bureau of Human Nutrition and</u>			
<u>Home Economics):</u>			
Advanced from Department of			
Defense, Department of the			
Army:			
To compile and furnish tables			
of food composition values .	2,059	- -	- -
To develop composition and			
nutritive value data on beef			
suited to the needs of the			
Armed Forces .....	- -	50,000:	- -
<u>Miscellaneous Contributed Funds,</u>			
<u>Department of Agriculture (Bureau:</u>			
<u>of Human Nutrition and Home</u>			
<u>Economics (Trust fund deposited</u>			
<u>by National Electrical Manufac-</u>			
<u>turers Association):</u>			
Comparison of fuels for home			
cooking, refrigeration, and			
water heating .....	- -	4,635:	1,965
<u>Obligations Under Reimbursements</u>			
<u>from Governmental and other</u>			
<u>agencies:</u>			
Salaries and Expenses:			
For sale of charts and for			
cooperative research investi-			
gations .....	7,626:	2,460:	- -
<u>TOTAL, OBLIGATIONS UNDER ALLOT-</u>			
<u>MENTS AND OTHER FUNDS .....</u>	47,536:	92,970:	34,840





BUREAU OF ANIMAL INDUSTRY

Purpose Statement

The Bureau of Animal Industry, established by the Act of May 29, 1884, conducts research and administers a program primarily concerned with the protection and development of the livestock, meat, poultry, and related industries.

1. Research includes:

- a. Experiments on the improvement of livestock (except dairy cattle), poultry and domestic fur animals, together with studies of methods of improving the quality and usefulness of their products.
- b. Investigations of diseases and parasites affecting all classes of livestock, poultry, and domestic fur animals.

2. Protective measures include:

- a. Inspection of animals and poultry at ports of entry, together with inspection and supervision of animal products or materials permitted entry under restrictions, in order to exclude diseases of foreign origin, particularly such dangerous diseases as foot-and-mouth disease and rinderpest, and examination for purposes of identification of purebred animals offered for entry free of duty.
- b. Inspection of livestock offered for export and of facilities on transporting vessels to assure their humane handling and safe transport.
- c. Control of interstate movement of livestock to detect and prevent the spread of communicable diseases, including inspection of all animals received at the larger stockyards; and administration of the 28-hour law which is designed to prevent cruelty to animals in interstate transportation.
- d. Supervision of the preparation of veterinary biological products to assure their purity and potency, and administration of a marketing agreement and order designed to maintain adequate supplies of hog cholera virus and anti-hog cholera serum.
- e. Control and eradication of diseases in the field, such as tuberculosis, brucellosis, cattle fever ticks, cattle and sheep scabies, hog cholera and related swine diseases, dourine of horses, etc., and of such diseases as foot-and-mouth disease, European fowl pest, etc., when such diseases occur in the United States.

- f. Federal meat inspection under the Meat Inspection Act, the Horse Meat Act, and the Imported Meat Act, and regulations promulgated thereunder having for their purpose the production of a clean and wholesome meat supply for human consumption.
- g. Cooperation with Mexico in the control and eradication of foot-and-mouth disease there. Protective measures in the United States are also pursued which include patrol of the Mexican-United States border to prevent entry of animals susceptible to the disease and to supervise the handling of any materials which might harbor the virus.
- h. Inspection and certification of canned animal foods upon application of manufacturers, financed by fees covered into the Treasury.

The Bureau maintains a central office in Washington, D. C., but most of its work is conducted in the field. Its stations, substations and laboratories are located in 450 cities and towns in the United States and Territories, and at 47 cooperating agricultural experiment stations. Work is also conducted in the field in Mexico and at 3 European research laboratories. Employees are engaged in work on farms, ranches, ports of entry into the United States, meat packing establishments, public stockyards, establishments licensed under the Virus Serum Toxin Act, etc. On November 30, 1951, there were 6,126 full-time employees, of whom 401 were in Washington and the remainder in the field; and 222 part-time employees who work intermittently in the field.

	Estimated, 1952	Budget Estimate, 1953
Appropriated funds	\$25,965,000	<sup>a/</sup> \$25,818,000

a/ In addition, the 1953 Budget proposes the cancellation of notes in the amount of \$11,240,532 to reimburse Commodity Credit Corporation for funds advanced and expenses incurred in fiscal year 1951 for control and eradication of foot-and-mouth disease.

Summary of Appropriations, 1952 and Estimates, 1953

(Amounts Shown Include Estimated Pay Adjustment Supplementals)

Item	Total estimated available, 1952 a/	Budget estimates, 1953	Increase (+) or Decrease (-)
Salaries and expenses:			
Animal research .....	\$3,698,000:	\$3,681,000:	-\$17,000
Animal disease control and eradication .....	8,517,000:	8,477,000:	-40,000
Meat inspection .....	13,750,000:	13,660,000:	-90,000
Total, direct annual appropriation .....	25,965,000:	25,818,000:	-147,000

a/ Adjusted for comparability with the appropriation structure proposed in the 1953 Budget Estimates, including comparable amounts for projects previously financed from "Eradication of foot-and-mouth disease and other contagious diseases of animals and poultry."



The Budget Estimates propose the consolidation of subappropriations under "Salaries and Expenses" as follows:

<u>Present</u>	<u>Proposed</u>
Animal research	Animal research
Animal disease control and eradication )	Animal disease control and eradication
Marketing agreements, hog )	
cholera virus and serum )	
Meat inspection	Meat inspection

This consolidation is proposed for the sole purpose of simplifying the appropriation structure and administration of the Bureau and will in no way affect the nature and scope of the work authorized and conducted.

In addition, the Budget Estimates propose the transfer to "Salaries and Expenses" of the following activities now being conducted under the appropriation "Eradication of foot-and-mouth disease and other contagious diseases of animals and poultry," and is being financed under the authority contained in the 1952 Department of Agriculture Appropriation Act:

<u>Activity to be Transferred</u>	<u>Subappropriation under "Salaries and Expenses" to which transfer would be made</u>
Inspections at public stockyards and in the field to detect immediately any possible introduction of foot-and-mouth disease into the United States	Animal disease control and eradication
Foot-and-mouth disease research	Animal research

It is essential that these activities be continued to assure adequate protection of the livestock industry. On the basis of experience in the past few years it is possible to estimate costs for these projects whereas it is still impracticable to estimate with any degree of accuracy the costs of control and eradication work in Mexico or for enforcing the Mexican border quarantine.

Inspections—Although a considerable time may elapse after the last known center of infection in Mexico has been eliminated, and eradication may seem assured, experience with the disease is such that there can be no certainty that it has, in fact, been completely eradicated. It is imperative, therefore, particularly in view of the extensive existence of the disease in all parts of the world in addition to Mexico, and the present day means of rapid transportation and extensive commerce with such countries, that there be the utmost vigilance at our large market centers to see that no animals reaching those centers are re-shipped to other points until an inspection has been made to assure that they are not

diseased. The major portion of all livestock on the farms eventually reaches one of the central markets and to allow such animals to be re-shipped without adequate inspection would greatly reduce chances for confining the infection to a limited area should the virus of this disease be brought to this country. Prompt detection of the disease is essential to effective control and eradication. In addition, the Bureau must be ready at all times to investigate immediately reports of animals on farms which are reported to manifest symptoms suspected of being foot-and-mouth disease, to assure that the existence of foot-and-mouth disease in the country might be known as soon as possible, and appropriate steps taken to localize the infection and eliminate it.

Research on foot-and-mouth disease as a phase of the cooperation with Mexico in the control and eradication of the disease in Mexico was authorized by the Act of February 28, 1947 (21 U.S.C. 114b-c-d) and undertaken shortly after the Mexican campaign got under way. It is now proposed that this research work be continued and re-directed toward those phases of the work which will be of greatest benefit to the United States should the disease ever gain entry here. Such research is authorized by the Act of April 24, 1948 (21 U.S.C. 113a).

The following table compares the existing appropriation and project structure for these items with that proposed in the 1953 Budget Estimates:





## Amounts Shown Include Estimated Pay Increase Supplements (P.L. 201)

<sup>1/</sup> Obligations estimated to be incurred under these activities which are currently financed by transfers of funds in accordance with authority in the 1952 Department of Agriculture Appropriation Act.



(a) Salaries and Expenses

	<u>Animal Research</u>	<u>Animal Disease Control and Eradication</u>	<u>Meat Inspection</u>	<u>Total</u>
Appropriation Act, 1952 (adjusted--see proposed structure, page ) .....	\$3,250,000	\$7,778,928	\$12,800,000	\$23,828,928
Anticipated pay adjustment supple- mental .....	215,000	400,000	950,000	1,565,000
Activities trans- ferred in 1953 esti- mates from "Eradica- tion of foot-and- mouth disease and other contagious diseases of animals and poultry" .....	233,000	338,072	- -	571,072
Base for 1953 .....	3,698,000	8,517,000	13,750,000	25,965,000
Budget estimate, 1953 .....	3,681,000	8,477,000	13,660,000	25,818,000
Decrease (due to partial absorption of pay adjustment costs) .....	-17,000	-40,000	-90,000	-147,000

PROJECT STATEMENT

Project	1951	1952 (estimated)	Decrease (pay adjustment absorption)	1953 (estimated)
1. Animal research:				
a. Animal husbandry .	\$2,246,709	\$2,151,600	-\$9,900	\$2,141,700
(1) Swine husbandry investigations ..	(381,301)	(389,938)	(-1,500)	(388,438)
(2) Sheep and goat husbandry inves- tigations .....	(373,559)	(353,236)	- -	(353,236)
(3) Horse and mule husbandry inves- tigations .....	(47,033)	(4,750)	- -	(4,750)
(4) Beef cattle husbandry inves- tigations .....	(487,523)	(486,576)	- -	(486,576)

(Continued on next page)



Project	1951	1952 (estimated)	Decrease (pay adjustment absorption)	1953 (estimated)
(5) Dual-purpose cattle husbandry investigations ..	(\$114,076)	(\$102,961)	(-\$2,961)	(\$100,000)
(6) Poultry hus- bandry investi- gations .....	(744,197)	(715,253)	(-1,553)	(713,700)
(7) Fur animal hus- bandry investi- gations .....	(99,020)	(98,886)	(-3,886)	(95,000)
b. Infectious and non- infectious diseases of animals .....	942,088	1,019,500	-3,200	1,016,300
(1) Cattle .....	(522,954)	(579,325)	(-3,200)	(576,125)
(2) Swine .....	(221,495)	(185,647)	- -	(185,647)
(3) Sheep and goats	(26,919)	(54,242)	- -	(54,242)
(4) Horses .....	(21,803)	(26,061)	- -	(26,061)
(5) Poultry .....	(113,882)	(137,004)	- -	(137,004)
(6) Fur animals ...	(35,035)	(37,221)	- -	(37,221)
c. Parasites and par- asitic diseases of animals .....	520,680	526,900	-3,900	523,000
(1) Cattle .....	(153,910)	(158,232)	(-3,900)	(154,332)
(2) Swine .....	(60,629)	(65,010)	- -	(65,010)
(3) Sheep and goats	(85,358)	(77,964)	- -	(77,964)
(4) Poultry .....	(38,374)	(37,410)	- -	(37,410)
(5) Fur animals ...	(15,162)	(15,860)	- -	(15,860)
(6) Treatments ....	(123,105)	(127,945)	- -	(127,945)
(7) Miscellaneous parasite investi- gations .....	(44,142)	(44,479)	- -	(44,479)
Subtotal .....	3,709,477	3,698,000	-17,000	3,681,000
2. Animal disease con- trol and eradication:				
a. Eradicating tuber- culosis and brucellosis .....	5,747,479	6,308,710	-40,000	6,268,710
b. Eradicating scabies:	109,243	173,200	- -	173,200
c. Eradicating cattle ticks .....	299,291	289,250	- -	289,250
d. Control of hog cholera and related swine diseases ....	28,842	32,940	- -	32,940
e. Determining the existence of diseases in the field .....	120,581	90,440	- -	90,440

(Continued on next page)

Project	1951	1952 (estimated)	Decrease (pay adjustment absorption)	1953 (estimated)
f. Import-export inspection and quarantine .....	\$353,590	\$366,390	- -	\$366,390
g. Supervision over interstate movement of livestock .....	708,022	748,130	- -	748,130
h. Control of manu- facture, importa- tion, shipment and marketing of viruses, serums, toxins, etc. ....	410,474	507,940	- -	507,940
Subtotal .....	7,777,522	8,517,000	-40,000	8,477,000
3. Meat inspection:				
a. Meat inspection operations at pack- ing plants under the Federal meat inspection service	12,509,257	13,455,700	-90,000	13,365,700
b. Determination of adulterations and other objectionable conditions in meat and meat food prod- ucts by laboratory analysis .....	175,680	189,800	- -	189,800
c. Inspection of imported meats and meat food products	64,750	70,500	- -	70,500
d. Bacteriological, pathological, and zoological inves- tigations relating to meat inspection	31,940	34,000	- -	34,000
Subtotal .....	12,781,627	13,750,000	-90,000	13,660,000
Total obligations .....	24,268,626	25,965,000	-147,000	25,818,000
Unobligated balance ...	+469,119	- -	- -	- -
Total pay adjustment costs .....	- -	[1,779,200]	[+62,655]	[1,841,855]
Total available or estimate .....	24,737,745	25,965,000	-147,000(1)	25,818,000

(Continued on next page)

Project	1951	1952 (estimated)
Transfer in 1953 from		
"Eradication of foot-		
and-mouth disease and		
other contagious		
diseases of animals		
and poultry, Agricul-		
tural Research Admin-		
istration, Department		
of Agriculture" .....	-\$502,645	-\$571,072
Transfer in 1952 esti-		
mates to "Salaries		
and expenses, Office		
of Information, Agri-		
culture" .....	+2,900	- -
Reduction pursuant to		
Sec. 1214 .....	+131,000	- -
Anticipated pay adjust-		
ment supplemental ...	- -	-1,565,000
Total appropriation or		
estimate .....	24,369,000	23,828,928

# DECREASE

(1) A decrease of \$147,000 due to partial absorption of pay adjustments will be met by:

- (a) a general reduction of \$17,000 in research on animal husbandry and diseases of animals
- (b) a reduction of \$40,000 in the program for the eradication of brucellosis
- (c) a reduction of \$90,000 in "Meat inspection" will be met by effecting adjustments in assignments of inspection personnel, made possible by the additional service to be rendered by each employee under the new annual leave law (P.L. 233 82nd Congress).



CHANGES IN LANGUAGE

The estimates include proposed language changes as follows (new language underscored; deleted matter enclosed in brackets):

1 Animal research: For animal husbandry investigations; investi-  
gations of diseases of animals and of tuberculin, serums, anti-  
toxins, and analogous products; and cooperation in the admini-  
stration of regulations for the improvement of poultry, poultry  
products, and hatcheries, as authorized by law (7 U.S.C. 429[,  
Public Law 662, approved August 4, 1950; \$3,250,000)], \$3,681,000.

2 Animal disease control and eradication: For the control and  
eradication of tuberculosis and paratuberculosis of animals,  
avian tuberculosis, [Bang's disease of cattle] brucellosis of  
3 domestic animals, scabies in sheep and cattle, \* \* \* and for  
carrying out the provisions of the Act of March 4, 1913 (21  
4 U.S.C. 151-158) and sections 56 to 60, inclusive, of the Act  
approved August 24, 1935 (7 U.S.C. 851-855), relating to veter-  
inary biological products, [\$7,731,022, including \$30,000 for  
the acquisition of land and construction of buildings for  
inspection of livestock at Canadian border ports of entry]  
5 \$8,477,000: Provided, That no payment hereunder as compensa-  
tion for any cattle condemned for slaughter for tuberculosis,  
paratuberculosis, or [Bang's disease] brucellosis shall exceed  
\* \* \*

6 [Marketing agreements, hog cholera virus and serum: For carry-  
ing into effect sections 56 to 60, inclusive, of the Act approved  
August 24, 1935 (7 U.S.C. 851-855) regulating the marketing of  
anti-hog-cholera serum and hog-cholera virus, \$47,906.]

7 Meat inspection: For carrying out the provisions of laws relat-  
ing to Federal inspection of meat and meat-food products,  
8 [including the purchase of one passenger motor vehicle for  
replacement only, \$12,800,000: Provided, That hereafter reim-  
bursement may be made by any person, firm, or organization for  
the expenses of meat inspection in excess of those which can  
be met from the amount appropriated for such purposes each  
year] \$13,660,000.

The first change in language deletes the citation of Public Law 662 which  
is now included in 7 U.S.C. 429 of the Supplement IV to the United States  
Code.

The second and fifth changes are proposed to bring the appropriation  
language into agreement with the change made by Public Law 238, approved  
October 30, 1951, which substitutes the words "brucellosis of domestic  
animals" for "Bang's disease of cattle" in the Act of May 29, 1884, as  
amended. The disease occurs in swine and goats and is transmitted by  
them to man. Only minor changes are now contemplated in the brucellosis  
eradication program under this authority.

The third and sixth changes propose to combine the present subappropriation item "Marketing agreements, hog cholera virus and serum" with "Animal disease control and eradication" for the purpose of simplifying the appropriation structure and the administrative functions of the Bureau. This consolidation will in no way affect the nature or scope of the work being conducted.

The fourth change proposes deletion of the authority for the acquisition of land and construction of buildings at Canadian border ports of entry for imported animals. No buildings will be constructed in fiscal years 1952 and 1953.

The seventh change deletes authority contained in the 1952 Appropriation Act to purchase a passenger motor vehicle for use in the meat inspection field office located in the District of Columbia which also services nearby points.

The eighth change deletes the proviso contained in the 1952 Appropriation Act authorizing reimbursement by packers for meat inspection in excess of those services which can be provided from appropriated funds since this language is permanent legislation.

STATUS OF PROGRAM

ANIMAL RESEARCH

Animal Husbandry Investigations

Current activities include research directed toward more efficient breeding, feeding, and management of poultry, fur animals and all livestock, except dairy cattle. Activities also include research on factors affecting the production of high quality products and their processing and preservation.

There are on American farms approximately 45 million cattle raised primarily for meat, 10 million dual-purpose cattle, 50 million hogs, 30 million sheep, 500 million chickens, 500,000 fur bearing animals, 6 million horses and mules, and 2 million rabbits. An increase in volume and efficiency of meat production is an urgent need. Through research in breeding, feeding, and management, it is possible to raise present levels of production and improve the quality of animal products.

Examples of Recent Progress:

- (1) Line cross Duroc gilts weaned 1.4 more pigs per litter than outbred control Duroc gilts. Purebred Duroc lines were selectively bred in cooperation with the Oklahoma Agricultural Experiment Station. When the purebred Duroc lines were crossed they produced purebred litters which were larger, heavier and more efficient than control purebred Durocs developed by outbreeding.
- (2) Beltsville No. 1 (Landrace-Poland China) hog established as a new breed. Swine breeders who have cooperated in the testing of this line under farm conditions have arranged with the Inbred Livestock Registry Association for the registration of their Landrace-Poland China pigs as Beltsville No. 1. Pigs of this line fed under record-of-performance conditions at Beltsville have averaged 1.45 pounds daily gain from weaning to 225 pounds feed lot weight. Under these conditions, 333 pounds of feed were required per 100 pounds live weight gain. The average yield of preferred cuts, including the ham, bacon, loin, shoulder and shoulder butt, was 49.5 percent of slaughter weight. This is an outstanding yield of preferred cuts. Reports of performance in the hands of cooperators have been very favorable with respect to purebred performance and in breeding combinations with hogs of other breeding for the production of market hogs.
- (3) Aureomycin makes runt pigs grow. Cull weanling pigs at Beltsville in 1950 were divided into test lots. The control lot receiving the normal good growing diet gained about 1/2 pound a day for the 60 days after weaning. An experimental lot receiving the growing diet plus aureomycin gained about 1 pound per day. The aureomycin fed pigs gained at a rate expected from good pigs of the same age while the control runt group would be unprofitable. Some lots of diseased pigs do not respond to aureomycin.



- (4) Thiouracil increases swine gains at cool weather temperatures. Thiouracil, a drug which lowers metabolic rate by suppressing thyroid activity, was demonstrated to improve efficiency of feed utilization of pigs at an environmental temperature of 50°F. but not at 90°F.
- (5) Radioactive thiouracil is eliminated from the body rapidly by pigs. Use of the radioactive compound enabled investigators to determine rate of excretion as about 65 percent during first 24 hours after administration and 15 percent during second 24 hour period. In view of the rapid elimination of radioactive thiouracil there appears no hazard to animals from its administration.
- (6) Low temperature rendering of lard improves quality. Rendering temperatures of 169° to 203°F. give yields of 96 percent of theoretically recoverable lard when applied to fats cooled to 0°F. and then ground through a plate with 0.125 inch holes. The resulting lard was bland and light in color, which are desired properties.
- (7) Hams cured by typical farm methods retain vitamin and protein values. Dry cured hams using salt, home curing or commercial curing mixtures showed no decline in vitamin or protein value after 6 months storage. Some loss in palatability occurred, more pronounced at storage temperatures of 70° and 90°F. than at lower temperatures.
- (8) Rambouillet rams produced at Dubois, Idaho, were tested in Texas in comparison with rams from other sources. The six laboratory rams tested produced offspring superior in clean fleece weight, staple length, face covering and body conformation. Ram lambs of this caliber surplus to experimental needs have been eagerly sought by producers for effecting improvement in range sheep production.
- (9) Yearling fleece weights are predictable from wool production performance of weanling lambs, to a reasonably accurate extent. Of six weanling traits studied at Dubois, Idaho, only weanling body weight and staple length of wool were important in predicting yearling fleece weights, the former being more useful in predicting grease fleece weight and the latter that of the clean fleece weight. Selection of lots at weanling age instead of having to wait until they are yearlings contributes substantially to economy and effectiveness in sheep breeding improvement.
- (10) Technique for evaluating lamb meat production developed. Lamb carcass values were determined at Beltsville by combined yield of preferred cuts. The sum of ribs, loins and legs of 211 lambs averaged 23.3 percent of their slaughter weight (in fleece). The variation amounted to about 8 pounds or 10 percent among these 75 pound lambs. Variation is largely heritable. Yield of preferred cuts provides an objective standard for family selection in breeding, thus furnishing a reliable new technique for increasing meat production efficiency in sheep through breeding.

- (11) Technique for diagnosis of rickets in foals developed. Normal values for serum alkaline phosphatase, an enzyme reflecting the level of bone forming activity, have been determined for foals from birth to weaning. These values will serve as a base for diagnosis of rickets by practicing veterinarians and nutritionists.
- (12) Small type and conventional type Hereford steers show equal feed efficiency to similar degree of market finish. Cooperative research at the Colorado (Ft. Lewis) State Experiment Station showed marked greater rate of feed lot gain for conventional than for small type steers. Pounds of feed required per pound of gain were about the same for each type. Since rate of gain is highly heritable and genetically independent of type, the breeder may improve rate of gain within the type of his choice through selective breeding.
- (13) Miles City Line 1 Herefords improved in feed lot performance by progeny test selective breeding. Estimate of genetic improvement in rate of gain in feed lot since the line was started in 1936 is 0.16 pounds per day. Among 1100 calves born in the line there never has been a dwarf. Fecundity is good to excellent. The type is large but steers finish acceptably at 15 months of age.
- (14) Selective breeding of beef cattle improves beef production. A third generation Brahman-Angus sire which was a double grandson of the previous best sire tested in the herd at the Jeanerette station produced 400 pound calves at 6 months of age on grass. This performance is outstanding for herd and station indicating important genetic improvement from the selective breeding program for the development of cattle adapted to the Gulf Coast area.
- (15) Economy of continuous growth of beef calves on limited feed demonstrated by use of identical twins. Results with six pairs of identical twins, yielding data equivalent in reliability to data from ten times that number of less closely related cattle, demonstrated that young cattle may be held for 6 months at least at half energy intake without impairing capacity for gain. Such restricted animals subsequently full fed reached market weight and finish on as little feed as their twins full fed continuously from birth.
- (16) Nitrogen fertilization of Coastal Bermuda pasturage in the spring profitably increased beef cattle yields at the Georgia Coastal Plain Experiment Station at Tifton, Georgia, when added to a base fertilizer treatment of 500 pounds of 4-8-6 per acre. Pastures fertilized in the spring with the base treatment alone produced 293 pounds of cattle gain per acre. Application of an additional 50 pound of nitrogen fertilizer increased cattle gains to 330 pounds per acre. When 100 and 200 pounds of nitrogen fertilizer were added to the base fertilizer treatment cattle gains were increased to 526 and 685 pounds respectively. Application of an additional 200 pounds of nitrogen fertilizer per acre thus increased beef production by 392 pounds over the areas receiving only the base fertilizer treatment. These gains were made between May 3 and October 18.



- (17) Dual-purpose cattle transmit efficient production of both meat and milk. Milk and meat production have been maintained in dual-purpose cattle through selective breeding. One sire group in the Milking Shorthorn herd at Beltsville now has had four successive generations of sires with daughters which qualified for Record of Merit based on first lactation records. Steer progeny of this sire group reached 900 pounds live weight at 500, 452 and 437 days for the first three successive generations within the herd, indicating progressive improvement in the transmission of increased meat production efficiency through the application of selective breeding techniques.
- (18) Some top cross combinations give outstanding egg production. The first year's laying performance tests at the Central Testing Station at LaFayette, Indiana includes crossbreds, commercial hybrids and standardbreds of outstanding reputation for egg production in comparison with top cross combinations of 35 inbred lines developed at cooperating State and Federal experiment stations with an outstanding private breeder strain of Single Comb White Leghorns and a similar strain of Single Comb Rhode Island Reds. Breed top crosses generally excelled top crosses within the breed. Some of the top crosses have given outstanding egg production which, if confirmed by further tests, will identify the inbred lines used in these top crosses as excellent material for breeders to use in producing hybrid chicks.
- (19) Chickens resistant to lymphomatosis (range paralysis) developed by selective breeding. One line of White Leghorn chickens at the Regional Poultry Laboratory at East Lansing, Michigan which has been selected for resistance to lymphomatosis suffers from about 10 percent annual mortality, when exposed to the disease from hatching. This may be contrasted with a susceptible line at the laboratory which suffers annual loss of 50 percent from the disease with similar exposure. The resistant line has given promising evidence of resistance in progeny from combinations with experiment station lines at cooperating State experiment stations.
- (20) Infertility of turkey eggs increased by supplementary lighting of males. Male turkeys receiving artificial light in winter to stimulate early breeding were found at Beltsville to molt and become sexually inactive earlier in the season than males which received no supplementary light. Further research on light intensity and duration and on the effects of hormones on molt and sterility may yield results enabling breeders to maintain fertility of males, thus making it unnecessary to maintain a reserve group of males as at present.



- (21) Antibiotics save protein in diets for growing chickens. Optimal growth in chickens is generally obtained with diets containing 21 percent protein. Experiments at Beltsville indicate that optimal growth may be obtained with diets containing 19 percent protein if they also contain aureomycin. This discovery indicates a possible saving of 125,000 tons of protein annually if applied throughout the United States.
- (22) Pelleted high fiber laying mash sustains egg production. When oat hulls comprised 64 percent of the unpelleted diet, laying hens ceased laying; the same diet in pelleted form sustained egg production in tests at Beltsville. Similar levels of fiber from alfalfa depressed production even when the diet was pelleted. Fiber is a limiting factor in selection of feed ingredients for poultry. This pelleting experiment may make possible wider use of some fibrous feeds and lessen dependence on whole grain.
- (23) Pullorum disease further reduced in poultry breeding flocks. The percentage of pullorum reactors on the first test in 37 million chickens tested in 1950-51 season was 0.54 which may be compared with 1.79 percent reactors in 30,000,000 chickens tested in 1947. About 2 million turkeys were tested in 1951 with 0.36 percent reactors compared with 1.21 percent reactors in 1947. Losses during the first three weeks of life in poultry are directly proportional to pullorum incidence in breeding flocks.
- (24) Meat Production Performance Test provides official recognition for flocks bred for efficient meat production. Consistent with the increased importance of commercial broiler production this test was established to make available to broiler growers comparative data on the performance of selected random samples of the breeders stock. The test consists of (1) a ten-week growing test for chicks, (2) a 300-day egg production test on the female parent stock, and (3) a measure of hatchability.
- (25) The status of work under the National Poultry and Turkey Improvement Plans is shown in the following table:

Item	1949	1950	1951
NATIONAL POULTRY IMPROVEMENT PLAN			
States cooperating .....	47	47	47
Hatcheries participating .....	4,438	4,637	4,482
Egg capacity of hatcheries .....	346,294,000	367,253,150	383,642,943
Hatchery-supply flocks .....	93,874	106,597	95,079
Birds in hatchery-supply flocks ..	27,409,109	34,700,337	33,719,373
Average percentage of reactors to pullorum tests (first test) ....	0.86	0.72	0.54
U.S.R.O.P. (U.S. Record of Performance) breeders .....	286	266	247

Item	1949	1950	1951
NATIONAL POULTRY IMPROVEMENT PLAN			
(Continued)			
U.S.R.O.P. flocks .....	397:	365:	339
Birds entered in trapnest flocks.	198,881:	194,085:	1/
U.S.R.O.P. breeding pens .....	4,712:	4,411:	1/
Females in U.S.R.O.P. breeding pens .....	70,848:	68,829:	1/
Meat Production Performance Test entrants .....	2/		9
<hr/>			
NATIONAL TURKEY IMPROVEMENT PLAN			
States cooperating .....	46:	46:	46
Hatcheries participating .....	768:	815:	895
Flocks .....	3,224:	3,922:	3,920
Birds .....	1,849,907:	2,132,644:	2,264,369
Average percentage of reactors to pullorum test (first test) ....	0.51:	0.39:	0.36
U.S.R.O.P. flocks.....	60:	58:	47
Candidate matings .....	695:	628:	650
Candidates trapped .....	8,327:	7,757:	7,320

- 1/ Information not available at time of reporting.  
2/ The Meat Production Performance Test was adopted as an optional section of the National Poultry Improvement Plan at the June, 1950 conference.

(26) Physical composition of fryer rabbit carcasses determined.  
Chilled carcasses of grade A, B and C fryer rabbits of 4-5 pounds live weight contained respectively: Bone, 19.19, 21.5 and 21.9 percent; separable fat, 6.5, 5.4 and 3.0 percent; separable lean, 64.5, 63.9 and 64.6. These analyses furnish a basis for calculating nutritional value of rabbit meat.

(27) New mink color phase "Topaze" genetically analyzed. Cooperative research at the University of Wisconsin indicates that genes for brown-eyed pastel and green-eyed pastel are on separate chromosomes. These two genes must be combined to produce "Topaze". This new combination apparently has a good chance of becoming one of the standard color phases of the industry.



Investigations of Infectious and Non-Infectious  
Diseases of Domestic Animals

Work in progress is directed toward diagnosis, cause, prevention, treatment and control of communicable diseases caused by bacteria, fungi, and viruses, such as brucellosis, tuberculosis, mastitis, hog cholera, swine erysipelas, fowl typhoid, and Newcastle and pullorum disease of poultry; non-infectious diseases and pathological conditions caused by metabolic disturbances, tumors, unhygienic practices, etc., and stock poisoning by plants. These diseases and conditions are responsible for annual losses in excess of 300 million dollars to livestock and poultry producers in this country. This research is contributing to the control of diseases of livestock and thereby improving efficiency of production.

Examples of Recent Progress:

- (1) Research on the duration of immunity to brucellosis induced in cattle with strain 19 vaccine showed that there was no evidence that resistance to brucellosis in calf-vaccinated cattle decreased with advancing age. In fact, the results indicate in most instances that resistance was somewhat higher in older animals.
- (2) Revaccination of cattle with strain 19 vaccine did not increase the degree of immunity when these animals were exposed during their third gestation period.
- (3) Bovine brucellosis can be transmitted by artificially inseminating susceptible cattle by the intrauterine method, with bull semen containing virulent Brucella abortus organisms. When semen from the same bull was used for artificially inseminating cattle by the intracervical method, the disease was not transmitted.
- (4) In cooperative research, X-disease has been produced experimentally for the first time in cattle. Experimental evidence indicates that there is a multiple source of the causative agent or agents. The precise nature of the agents has not as yet been determined.
- (5) A mastitis problem of a kind not previously reported upon was investigated. It involved approximately a third of the animals in a 200-cow dairy and resulted in very severe losses. It was determined to be caused by Cryptococcus neoformans, a type of yeast which produces lung and brain lesions in humans. Other investigations concerned the fundamental factors which cause variation in resistance to mastitis and included study of some which appear and associate with the feed and the functioning of the digestive tract of the animals.
- (6) Brucellosis has been demonstrated in suckling pigs at 28 days of age and infected weanling pigs were found capable of transmitting the disease to pigs of a similar age. It was found that a large percentage of pigs infected during the suckling period recover from brucellosis within one year. There is no evidence that latent brucellosis exists in swine which have sucked infected dams and the pigs are negative to the agglutination test at the time of weaning.



Swine are only slightly susceptible to Brucella abortus, which affects cattle, when exposed by natural procedures. Bacteria, other than Brucella, which have been isolated from swine are believed to be responsible for false agglutinin reactions.

- (7) During the 1950 serum-virus hog cholera vaccination season, as in the 1949 season, many hogs sickened following vaccination. The trouble occurred in several States, and death losses were high. Investigations carried out in the field and laboratories revealed the cause to be a variant hog cholera virus against which regular serum failed to protect, confirming the findings of the preceding year. A new method of handling inoculating virus has been introduced which utilizes -40° C. freezing to hold large lots of material that have been proved to be variant-virus free by exhaustive tests.
- (8) Aureomycin helpful against necrotic enteritis. Weanling pigs on a niacin deficient diet were protected against necrotic enteritis by the addition of 4.4 mg aureomycin per hundred grams of diet for about 3 weeks to an extent similar to protection given by niacin supplementation. Niacin plus aureomycin gave no greater protection than either substance alone.
- (9) In toxicity studies of insecticidal sprays and dips the use of radioactive isotopes showed that recommended concentrations of insecticides can be highly toxic if the formulation is faulty, also that the specific gravity vat test may not necessarily indicate either parasiticial effectiveness or safety. Results of toxicity test of EQ-335 screwworm treatment which contains three percent lindane (pure gamma isomer of BHC) showed this preparation to be safe for use on livestock. The best antidote thus far found for poisoning by the newer insecticides consists in intravenous injections of sodium bicarbonate solution together with removal of the insecticide.
- (10) Studies of an extremely virulent strain of Newcastle disease virus showed that it could regularly produce over 95 percent mortality in laying hens and mature roosters regardless of whether the birds were exposed by natural or artificial means. Present Newcastle disease vaccines were shown experimentally to offer considerable promise as effective immunizing agents against this virulent disease. Research is in progress to evaluate several types of vaccines as to their ability to produce a lasting immunity against both low virulent and high virulent Newcastle disease viruses.
- (11) The results of investigations indicate that the most important means of transmission of fowl cholera, a widely prevalent septicemic disease, is through contact with apparently healthy carriers. Eggs were proved not to be responsible for transmission. It has been found that a serological test has possibilities as a diagnostic procedure for detection of carriers but continued developmental research is necessary.
- (12) Steatitis (yellowfat or nonsuppurative panniculitis) in mink has been produced experimentally by feeding a diet low in vitamin E, containing a large amount of unsaturated fatty acids such as fish scrap. The disease can be prevented by feeding mixed natural tocopherols or adding sufficient wheat germ meal to the diet.

Investigations of Parasites and Parasitic  
Diseases of Domestic Animals

Current research includes work to develop methods of coping with internal and external parasites and the diseases they cause, such as coccidiosis of livestock and poultry, trichinosis of swine, stomach, intestinal, and lungworms of farm animals, liver flukes of ruminants, cattle grubs, and mange mites of livestock. Parasites are estimated conservatively to cause an annual loss in excess of 200 million dollars. This research is contributing to the control of parasites and parasitic diseases and thereby improving the efficiency of livestock production.

Examples of Recent Progress:

- (1) Calves raised in individual portable pens devised by the U.S. Regional Animal Disease Research Laboratory, Auburn, Alabama, primarily for the prevention of coccidiosis, grew better, were of larger size, and gained more weight than comparable calves raised in a standard-type barn. At the age of 6 months the pen-raised calves had an average weight of 30 pounds more than the barn-raised calves. The calves raised in the barn were passing about 30 times as many coccidia as those in the portable pens, and acquired more intestinal worms and had more respiratory trouble than the pen-raised calves.
- (2) One of the intestinal roundworms of cattle, known as the thread-necked strongyle, was found to produce scouring, loss of appetite, and to retard the weight gains of calves, when present in the intestine in large numbers. Even when present in numbers insufficient to produce visible symptoms, the parasites still had a marked retarding effect on weight gains. The setback in weight was still in evidence 6 months after infection.
- (3) In experiments carried out in Georgia it was determined that feed lots must be kept dry and free of herbage, if parasitism in cattle with its accompanying deleterious effects on fattening, is to be avoided. The grass provides ideal situations for the larvae of roundworm parasites, which are injurious to the health of cattle. In dry lots many of these larvae perish, partly as a result of drying, and also because they cannot get onto grass and thus be swallowed in large numbers by the host animals.
- (4) In studies carried out in the Gulf Coast Region of Texas it was determined that calves treated for the removal of stomach and intestinal parasites gained in 3 months as much as 32 pounds more than comparable calves which had not been treated. The standard treatment with phenothiazine was found to be sufficient to give the maximum results, so far as weight gains were concerned.



- (5) Investigational work in Colorado, New Mexico, South Dakota and Washington to develop practical procedures for controlling cattle grubs showed that these pests can be significantly reduced if the control work is carried out effectively and systematically. For large herds and range cattle generally, high-power pressure sprayers were used, whereas for dairy herds and for small farm beef herds hand washing was found to be practical and effective. The application of a solid stream of spray material under high pressure was much more effective in killing grubs than the usual cone sprays.
- (6) Work carried out during the year showed that common sheep scabies was acquired by a bovine that had been in contact with scabby sheep. The disease was transmitted back again to sheep, but not to calves. Before this work was done it was commonly believed that sheep scabies was not transmissible to cattle or any other animals, except sheep.
- (7) The success in eradicating sheep scabies following a single dipping in benzene hexachloride is due, apparently, to the residual effect of the chemical. Sheep dipped in a 0.06 percent suspension of the gamma isomer of this chemical were kept together in one pen with scabby sheep. Despite this close association, the dipped sheep remained free of scabies for a period of 3 months, and resisted this disease even when mites from the scabby sheep were placed on them.
- (8) Sarcoptic and chorioptic scabies in cattle were cured by two treatments with lindane at a concentration of 0.075 percent given about 10 days apart. Smaller concentrations proved ineffective for eradication.
- (9) The fringed tapeworm of sheep, which affects the liver, pancreas, and intestine, can remain in the animals for 2-1/2 years or longer. Infested sheep, voided the tapeworm eggs throughout the year, and thus remained a source of danger to other sheep. The parasite eggs proved to be highly resistant to unfavorable environmental conditions, and survived nearly 3 months at sub-zero temperatures.
- (10) Four compounds of arsenic, in addition to lead arsenate, were found to be 100 percent effective for the removal of intestinal tapeworms from sheep. Ferric arsenate, one of the compounds tested, removed the common stomach worm as well as the tapeworm. Even though lead arsenate has already proved to be safe and effective for removing the common intestinal tapeworm from ruminants, the desirability of eliminating lead, a substance known to have slight cumulative deleterious effects, as a component of the treatment, is obvious. The action of lead arsenate is not dependent on lead; however, one or more of the four new compounds tested may soon supersede lead arsenate, when treatment against these tapeworms is indicated, and thereby avoid the use of a substance having deleterious effects.



- (11) A severe outbreak of disease in feeder lambs in the Middle West resulted in a death loss of about 30 percent of over 8,000 animals, and delayed finishing the survivors for market by two to three months. The losses were found to have been caused by stomach worms, intestinal roundworms, and lungworms. The outbreak resulted from faulty management practices, which involved overcrowding the animals on irrigated pastures, and rotating them in such a manner as to produce the disastrous results noted.
- (12) The free-choice consumption of salt medicated with phenothiazine greatly reduced the chance of severe infections with the common stomach worm, one of the deadliest parasites of sheep. Lambs given the medicated salt developed lower grade infections and disseminated these parasites to a far lesser extent than comparable lambs which had access to ordinary stock salt.
- (13) The free-choice administration to goats 1:12 mixture of phenothiazine and salt for the control of intestinal parasites cannot be employed as the sole measure of parasite control when kids are running with the does. Does with nursing kids must be isolated from the milk herd and given special individual treatment to prevent damaging parasitism.
- (14) In the South it was found that pasture-raised pigs harbored fewer species of parasites and smaller numbers of each species than those raised on bare lots. The pigs acquired the parasites from the sows, which harbored all of the different kinds common to swine in that region. Pigs on pastures acquired intestinal roundworms, nodular worms, intestinal threadworms, and kidney worms, whereas those on the bare lots acquired the four kinds already named and, in addition, whipworms, lungworms, and stomach worms.
- (15) Pigs can acquire trichinae by eating feed that has become contaminated with the droppings of infected rats. This mode of transmission of trichinae, which are the cause of trichinosis in swine and human beings, was established by experiments in which it was shown conclusively that the droppings of rats infected with trichinae served to infect pigs with these parasites.
- (16) The drug sulfaquinoxaline was found to be useful for the prevention of cecal coccidiosis, the most fatal form of this disease in poultry. It was determined that the overall losses from outbreaks of coccidiosis could be materially reduced, if the medication was started as soon as symptoms were observed in the flock. The birds already showing symptoms of the disease at the time of treatment derived little or no benefit from it, but many of those not yet affected escaped the disease altogether or developed only a mild form of it.
- (17) About one-third of a group of turkeys placed on ground contaminated with the eggs of the crop worm died, and of the survivors a number became sick with symptoms characteristic of crop worm disease. The fact that the heaviest losses occurred in the fall, when the birds were nearing market age, places the crop worm in the front line as a factor to be reckoned with in the economical production of turkeys.

- (18) Studies in California showed that rearing of rabbits on the ground, a practice about which breeders there have been inquiries, produced severe losses. Chiefly because of the depredations of coccidiosis, fryer production under such circumstances was sharply curtailed. Tests showed that the use of hutches with self-cleaning of wire floors practically eliminated losses from coccidiosis.

#### ANIMAL DISEASE CONTROL AND ERADICATION

##### Eradicating Tuberculosis and Brucellosis

Current activities: An extensive cooperative field program is conducted to eradicate tuberculosis and brucellosis (Bang's disease). Work is carried on in all States; tuberculosis eradication is also carried on in Hawaii, Puerto Rico, and the Virgin Islands, and brucellosis (Bang's disease) eradication in Puerto Rico. Indemnities are paid for cattle under certain legal and administrative restrictions.

##### Examples of Recent Progress:

- (1) The incidence of tuberculosis in cattle was further reduced from 0.19 to the new low figure of 0.14 percent during the past fiscal year. Cattle tested numbered 8,847,228 compared with 9,439,811 for the previous year; 12,353 reactors were removed from the 503,933 herds tested.
- (2) The incidence of brucellosis of cattle was further reduced from 3.5 to 3.1 percent during the past fiscal year. Testing was conducted in 565,155 herds containing 5,640,836 cattle, with 172,322 reactors being disclosed. Over 60,000 reactors were held in calf vaccinated herds for gradual disposal by slaughter without payment of indemnity.
- (3) 420 counties located in 21 States and Puerto Rico were listed as modified certified brucellosis-free areas. North Carolina, New Hampshire, and Maine are the only States in which all counties have qualified for that status, although some others are approaching it.
- (4) Calf vaccination with strain 19 vaccine increased 23.1 percent over the previous year. 2,542,333 calves between 4 and 8 months of age were officially vaccinated, bringing the total vaccinations since the inauguration of this practice in 1941 to 10,197,690.

- (5) Comparison of funds provided by the Federal Government and co-operating States and counties for the eradication of tuberculosis and brucellosis for the fiscal year 1952 is as follows:

	<u>Tuberculosis</u>		<u>Brucellosis</u>	
	<u>Federal</u>	<u>Cooperators</u>	<u>Federal</u>	<u>Cooperators</u>
Operating funds.....	\$1,600,000	\$4,340,122	\$3,199,710	\$6,673,651
Indemnity payments .....	300,000	1,290,415	850,000	1,614,525
Total .....	<u>\$1,900,000</u>	<u>\$5,630,537</u>	<u>\$4,049,710</u>	<u>\$8,288,176</u>

- (6) The following tables show the average State and Federal indemnity payments and other data pertaining to the programs for control and eradication of tuberculosis and brucellosis:



RECORD OF TESTING FOR  
TUBERCULOSIS AND BRUCELLOSIS  
FISCAL YEAR 1951

State	Tuberculosis			Brucellosis			
	Cattle		Percent	Cattle		Percent	Reactors
	Tested	Reactors		Tested	Reactors	Held 1/	Vaccinated
Alabama	43,216	0.02	::	63,102	3.8	:	305
Arizona	24,108	0.14	::	25,457	3.0	:	326
Arkansas	30,342	0.003	::	51,210	7.1	:	0
California	809,606	0.24	::	0	0.0	:	0
Colorado	29,006	0.08	::	96,422	5.2	:	4,837
Connecticut	169,544	0.09	::	39,137	2.0	:	648
Delaware	47,076	0.11	::	14,077	0.8	:	8
Florida	99,639	0.05	::	94,443	5.2	:	2,262
Georgia	48,614	0.07	::	112,306	4.8	:	477
Idaho	30,573	0.03	::	30,744	3.9	:	679
Illinois	607,834	0.16	::	315,213	3.0	:	5,276
Indiana	196,592	0.17	::	149,350	4.5	:	0
Iowa	246,300	0.25	::	81,544	6.5	:	6
Kansas	216,000	0.06	::	0	0.0	:	0
Kentucky	37,703	0.19	::	53,450	4.1	:	959
Louisiana	15,466	0.38	::	35,701	10.6	:	0
Maine	59,735	0.11	::	134,568	0.9	:	594
Maryland	225,291	0.08	::	81,505	1.0	:	215
Massachusetts	183,675	0.09	::	767	0.7	:	5
Michigan	183,781	0.36	::	177,832	2.1	:	2,505
Minnesota	604,602	0.04	::	564,266	3.4	:	5,384
Mississippi	57,098	0.04	::	107,981	3.9	:	99
Missouri	147,379	0.03	::	107,614	6.7	:	0
Montana	20,562	0.02	::	54,288	3.4	:	1,850
Nebraska	104,710	0.13	::	0	0.0	:	0
Nevada	2,179	0.00	::	10,538	2.0	:	0
New Hampshire	101,861	0.01	::	150,851	0.5	:	25
New Jersey	224,120	0.13	::	91,891	1.0	:	358
New Mexico	22,847	0.07	::	38,343	0.9	:	62
New York	1,366,250	0.14	::	362,281	4.2	:	15,177
North Carolina	90,834	0.004	::	247,870	0.7	:	36
North Dakota	25,278	0.21	::	205,274	3.5	:	1,170
Ohio	497,707	0.12	::	168,233	3.8	:	0
Oklahoma	96,479	0.07	::	84,741	5.6	:	316
Oregon	176,879	0.04	::	233,941	1.2	:	0
Pennsylvania	389,691	0.28	::	411,249	1.7	:	725
Rhode Island	24,715	0.07	::	4,685	0.2	:	0
South Carolina	48,550	0.09	::	81,811	1.1	:	138

State	Tuberculosis			Brucellosis			
	Cattle : Percent:			Cattle : Percent:			Calves
	Tested	Reactors:		Tested	Reactors:	Held <sup>1/</sup>	Vaccinated
South Dakota .....	75,497:	0.14	::	8,353:	8.2	: 490:	6,812
Tennessee .....	39,119:	0.13	::	50,023:	2.9	: 450:	100,447
Texas .....	144,926:	0.15	::	92,057:	4.5	: 0:	1,122
Utah .....	17,444:	0.20	::	43,946:	4.3	: 1,870:	14,938
Vermont .....	176,737:	0.04	::	64,566:	4.3	: 2,795:	51,916
Virginia .....	149,574:	0.04	::	103,149:	2.7	: 112:	55,749
Washington .....	104,579:	0.10	::	114,862:	2.2	: 232:	62,504
West Virginia .....	37,913:	0.01	::	128,958:	0.9	: 0:	6,133
Wisconsin .....	613,818:	0.13	::	449,706:	3.2	: 9,146:	352,406
Wyoming .....	28,002:	0.09	::	31,554:	2.9	: 11:	34,153
Hawaii .....	18,321:	0.32	::	0:	0.0	: 0:	0
Puerto Rico .....	135,256:	0.10	::	70,977:	1.9	: 870:	11,509
Totals.....	8,847,228:	0.14	::	5,640,836:	3.1	: 60,418:	2,542,333

<sup>1/</sup> Reactors held, usually in calf vaccination herds, for deferred slaughter when no longer of value for breeding or production purposes. No indemnity is paid on this class of reactor.



STATEMENT OF COMPARATIVE TESTING, HERDS AND CATTLE UNDER SUPERVISION, MODIFIED ACCREDITED AREAS,  
AVERAGE APPRAISAL, SALVAGE, AND STATE AND FEDERAL INDEMNITY IN TUBERCULOSIS ERADICATION WORK  
FISCAL YEAR 1935 to 1951 INCLUSIVE

Fiscal Year	Tests Conducted		Reactors found	Per- cent infection	Under Supervision		Modi- fied accredi- ted areas*	Average during year			
	Herds	Cattle			Herds	Cattle		Apprai- sal	Salvage	State in- demnity	Federal Indemnity
1935	2,378,668	25,237,532	376,623	1.5	6,590,863	48,768,627	2,428	\$57.55	\$15.19	\$15.87	\$18.70
1936	1,944,624	22,918,038	165,496	.7	6,515,273	59,907,935	2,921	77.66	26.50	10.18	22.44
1937	961,109	13,750,308	94,104	.7	6,745,471	61,640,711	3,030	86.04	28.94	12.20	22.72
1938	1,007,586	14,108,871	89,359	.6	6,471,538	62,640,358	3,124	86.76	32.16	16.41	18.12
1939	750,806	11,186,805	60,338	.5	6,372,720	60,439,030	3,142	89.01	34.49	18.96	15.97
1940	819,408	12,222,318	56,343	.46	6,191,330	61,570,426	3,148	91.05	37.12	20.44	16.20
1941	777,435	12,229,499	40,702	.3	6,235,198	62,696,167	3,151	96.50	40.99	20.95	16.48
1942	681,504	10,983,086	28,008	.26	6,320,006	63,073,213	3,151	109.69	50.35	21.49	16.55
1943	563,413	9,308,936	17,167	.18	6,317,670	63,846,496	3,151	135.19	65.03	27.50	18.75
1944	524,927	8,894,466	18,338	.2	6,153,069	64,519,652	3,151	154.53	59.93	36.07	21.72
1945	484,749	8,105,480	19,534	.24	6,120,528	64,790,921	3,151	161.32	59.78	40.31	22.71
1946	505,296	8,454,463	19,464	.23	6,035,783	65,981,099	3,150**	174.20	69.00	37.26	23.89
1947	515,517	8,312,919	16,666	.2	6,082,666	65,577,421	3,150	199.46	83.55	40.81	24.19
1948	523,924	8,294,423	15,943	.19	6,044,170	66,246,215	3,150	234.60	119.74	38.53	23.90
1949	536,162	8,737,501	17,007	.19	5,985,215	65,419,332	3,150	285.78	139.46	37.68	24.72
1950	539,799	9,439,811	17,733	.19	5,991,703	65,443,353	3,150	272.87	123.24	43.40	25.05
1951	503,933	8,847,228	12,353	.14	5,808,062	64,824,960	3,149***	323.70	174.64	43.59	24.92

\* Includes Puerto Rico and the Virgin Islands.

\*\*Reduction is due to consolidation of two counties.

\*\*\*Reduction is due to fact no cattle under supervision in District of Columbia.



STATEMENT OF COMPARATIVE TESTING, HERDS AND CATTLE UNDER SUPERVISION, AVERAGE APPRAISAL, SALVAGE,  
AND STATE AND FEDERAL INDEMNITY IN BANG'S DISEASE ERADICATION WORK  
FISCAL YEAR 1935 to 1951 INCLUSIVE

Fiscal Year	Tests Conducted		Reactors found		Reactors held	Per cent infection	Under Supervision		Appraisal	Average during year			Federal Indemnity
										Salvage	Paying Indemnity	State Indemnity	
	Herds	Cattle	Herds	Cattle			Herds	Cattle	sal	vage	Indemnity	Indemnity	
1935	212,482	3,317,760	361,010		--	11.5	187,109	2,936,347	\$56.86	\$19.87	1	\$27.99	\$24.29
1936	470,788	6,674,709	457,104		--	6.8	449,644	5,780,418	70.65	27.44	2	21.57	26.86
1937	630,917	8,021,167	397,864		--	5.0	719,452	7,877,612	70.67	27.94	5	19.25	26.45
1938	671,310	7,837,443	324,532		--	4.1	1,035,454	9,447,137	80.37	32.07	10	20.36	26.69
1939	724,613	7,591,398	219,165		--	2.9	1,372,410	11,111,643	97.17	33.97	28	26.09	20.00
1940	590,393	6,937,428	171,953		--	2.5	1,615,755	12,315,329	90.85	34.99	36	17.12	14.96
1941	677,544	7,465,254	182,075		--	2.4	1,883,914	13,932,693	93.28	37.68	40	17.19	15.19
1942	591,835	6,891,219	209,238		39,586	3.0	2,105,294	15,627,027	99.19	52.06	41	17.71	15.83
1943	392,636	5,185,228	197,329		53,558	3.8	2,199,535	16,616,522	128.03	64.87	40	18.63	16.77
1944	386,266	5,235,912	226,079		75,499	4.3	2,254,235	17,326,138	143.34	59.75	40	22.54	19.30
1945	395,236	5,213,458	243,050		86,738	4.7	2,307,585	17,545,638	139.35	56.63	40	22.14	19.25
1946	389,814	4,876,866	245,786		74,922	5.0	2,360,699	17,870,154	119.65	68.64	40	22.07	19.34
1947	454,789	5,133,814	232,293		68,977	4.5	2,249,118	17,589,018	178.25	82.93	40	23.44	20.64
1948	533,936	5,434,792	232,199		68,653	4.3	2,291,760	18,128,318	203.98	107.38	39	24.44	21.17
1949	563,501	5,671,347	226,691		66,351	4.0	2,165,364	17,126,480	256.46	132.11	37	25.67	23.41
1950	618,801	5,974,721	208,298		60,686	3.5	2,299,556	18,527,624	237.68	114.21	31	25.16	22.75
1951	565,155	5,640,836	172,322		60,418	3.1	2,324,621	19,197,790	326.85	189.45	22	23.47	21.41

1/ Beginning May 1, 1939, Federal indemnity payment limited to not exceed total amount paid by cooperating State agencies.  
Note: Federal indemnity will not be paid for reactors held in calfhood vaccinated herds.

### Eradicating Scabies

#### Current activities:

Inspection and dipping for cattle and sheep scabies is carried on cooperatively in 29 States. Premises and other specified areas are quarantined as required. These skin diseases are highly contagious and if unchecked cause great financial losses in flesh, unthrifty condition, arrested growth, and at times death losses are heavy. In sheep there is also a marked decrease in the quantity and quality of wool produced.

#### Examples of Recent Progress:

- (1) The dipping program in Mississippi, Virginia, and West Virginia has continued to show good results and every effort is being made to eradicate the infection completely in these States. During 1951 there was quite a scattering of outbreaks in Texas where intensive dipping operations were in progress. Outbreaks in several Western range states show the need for constant vigilance to promptly detect and eliminate this highly contagious skin disease before it has had an opportunity to become reestablished in the vast range areas that have enjoyed freedom from scabies for many years. An intensive eradication program in Louisiana and Mississippi is now underway. The effectiveness of the eradication program is of prime importance to the sheep and cattle industry of the country as sheep cannot be grown profitably when affected with scabies.

Sheep and cattle scabies eradication in the past fiscal year is indicated by the following table:

	Sheep		Cattle	
	<u>F.Y. 1950</u>	<u>F.Y. 1951</u>	<u>F.Y. 1950</u>	<u>F.Y. 1951</u>
Field inspections ..	5,978,587	5,278,723	319,366	444,364
Dippings .....	291,190	579,107	2,801	4,436
Infected animals ...	49,484	69,121	945	1,081
Exposed animals ....	70,979	149,338	525	1,098

### Eradicating Cattle Ticks

#### Current activities:

The inspection and dipping for cattle fever ticks is carried on in close cooperation with State and County authorities and cattle owners in Florida and in parts of Texas and California adjacent to the Mexican Border. A systematic eradication program is also in progress in Puerto Rico. Originally over one fourth of the country was under quarantine for tick fever. At present the disease in the United States is limited to areas adjacent to Mexico. The danger of reinfestation is constantly present due to our close proximity to tick infested areas in Mexico and islands in the West Indies. Vigilance in dealing effectively with outbreaks that occur from time to time is of prime importance to the livestock industry of the South.



Examples of Recent Progress:

- (1) Bureau and cooperative employees supervised 4,675,208 inspections or dippings of cattle for fever ticks and 476,286 inspections or dippings of horses and mules. In Puerto Rico, where systematic eradication is under way, it was also necessary to treat sheep and goats on infested premises because the infestation is of the tropical variety of tick. This required 552,451 inspections or dippings. Total inspections and dippings were 5,703,945 as compared with 7,163,974 in the fiscal year 1950. This decrease was largely the result of progress made in tick eradication in Florida.
- (2) On December 1, 1950, the Federal quarantine for fever ticks in Florida was removed from the counties affected by it. Dippings and inspections of livestock are being continued in an effort to clean up any remaining infestation. Due to the close proximity of Florida to tick infested islands in the West Indies with which there is extensive commerce, danger of reinfestation is constantly present. It is therefore necessary to maintain a limited number of trained personnel in that State to effectively deal with any outbreaks that may occur.
- (3) In California and Texas, ticks on stray or smuggled animals from Mexico are still a problem. Reinfestations are constantly occurring in Texas due to these illegal movements. A narrow strip adjacent to the Mexican border, approximately 500 miles long, from Del Rio, Texas, to the Gulf of Mexico, is under Federal quarantine and this area is regularly patrolled by Bureau employees. It is expected reinfestations will continue to occur until some effective barrier is placed along this line. All Mexican territory adjacent to the international boundary along the lower Rio Grande is infested with fever ticks.

Control of Hog Cholera and Related Swine Diseases

Current activities:

Assistance is given to swine growers and others in preventing or controlling outbreaks of hog cholera and related swine diseases. Efforts are made to secure the widest application of the best known effective preventive and control measures in order to reduce swine losses from disease.

Examples of Recent Progress:

- (1) Hog cholera continues to be present in practically all sections of the country. Active field work on hog cholera and related swine diseases is at present confined to the Corn Belt where the nation's swine industry is more heavily concentrated. The variant hog cholera virus appeared again in the summer of 1950. Field workers were engaged principally in investigations of the variant, which did not occur in 1951.



## Determining the Existence of Diseases in the Field

### Current activities:

Investigations are made of diseases which appear to be of a communicable nature in order that prompt control and eradication measures may be taken without delay. In recent years investigations for the most part have covered such diseases as dourine of horses, anthrax, and equine encephalomyelitis.

### Examples of Recent Progress:

- (1) Laboratory tests for dourine disclosed no reactors. The continued testing of horses for dourine is necessary so long as the disease exists on the Mexican side of the border. Its early detection is necessary in order to prevent dissemination of the disease into the United States.
- (2) Sporadic outbreaks of anthrax were reported from Alabama, California, Louisiana, Mississippi, Nevada, New York, South Dakota, and Texas. Bureau employees continued to furnish assistance in administering preventive treatment against the disease to Indian-owned cattle on reservations.

## Import-Export Inspection and Quarantine

### Current activities:

Measures are taken to safeguard the livestock industry against serious losses by preventing the introduction of destructive communicable diseases, such as foot-and-mouth disease and rinderpest, from other countries. Work is conducted at sea, air, and border ports. Livestock offered for importation into this country are inspected and when necessary are quarantined. The importation of animal products, hay, straw, and similar materials which might be the means of introducing dangerous livestock diseases is also supervised. This includes prevention of the landing of meats as sea stores or cargo or of garbage derived from meats from countries where dangerous animal diseases exist.

Purebred animals are further examined at ports of entry for identification purposes to determine their eligibility for entry free of customs duty. Livestock offered for export are also inspected for diseases. Facilities on transporting vessels are required to meet rigid specifications to assure humane handling and safe transport of the animals.

### Examples of Recent Progress:

- (1) More than 470,000 animals (including poultry) were inspected for disease at ports of entry during the fiscal year 1951. Of the animals inspected, 1,298 (including poultry) were refused entry on account of disease. The decrease from approximately 621,000 animals inspected in the fiscal year 1950 was due largely to decreased importations of Canadian cattle. Importations were as follows:

<u>Ports of entry</u>	<u>Cattle</u>	<u>Swine</u>	<u>Sheep</u>	<u>Goats</u>	<u>Equines</u>	<u>Poultry</u>	<u>Other</u>
Ocean ports ....	818	388	1,027	1,626	541	2,098	60
Canadian border ports .....	367,712	4,038	46,353	42	25,874	11,230	39
Mexican border ports .....	- -	- -	- -	- -	7,054	- -	- -
Total .....	368,530	4,426	47,380	1,668	33,469	13,328	99

- (2) The identification and certification of purebred animals for free entry, by species, was as follows: 231 horses; 21,940 cattle; 3,341 sheep; 917 swine; 29 goats; 721 dogs; 9 cats; a total of 27,188 for the fiscal year 1951.
- (3) During the past fiscal year, 74,264,226 hides and skins were imported. Of this total, 4,316,024 were permitted entry subject to further restrictions. Sanitary control was exercised over 17,328,872 pounds of animal casings admitted to the United States, consisting of 15,344,376 pounds of certified casings and 1,984,496 pounds of casings released after disinfection. Animal products were transported to and handled at approximately 200 approved destination establishments. All railroad cars, trucks, and premises involved in the transportation and handling of products permitted entry subject to further restriction were cleaned and disinfected.
- (4) Animals inspected for exportation during the past year are shown by species and country of destination in the following table:

<u>Kind of animal</u>	<u>Canada</u>	<u>Mexico</u>	<u>Other Countries</u>	<u>Total</u>
Cattle .....	894	1,768	4,720	7,382
Swine .....	69	150	547	766
Sheep .....	58	663	426	1,147
Goats .....	18	73	23	114
Horses .....	32	815	1,018	1,865
Mules .....	0	75	6,416	6,491
Asses .....	0	2	16	18
Total .....	1,071	3,546	13,166	17,783

#### Supervision over Interstate Movement of Livestock

##### Current activities:

Inspections are made of livestock received at the larger public markets in order to prevent the spread of disease. When diseases are found, appropriate control measures are taken. Railroad cars, trucks, chutes, alleys, pens, etc. are disinfected under Federal supervision as required. The existence of disease is reported to the district of origin in

order that steps may be taken promptly to localize or eradicate it. The detection at these locations of diseases imported in this manner is an invaluable safeguard to the livestock industry. Measures are also undertaken to enforce the 28-hour law which is designed to prevent overconfinement of animals in interstate transit by common carrier; and to assure proper feeding, watering, and resting thereby reducing losses through shrinkage, injury, etc.

Examples of Recent Progress:

- (1) Volume of work during fiscal year 1951 is reflected in the following tables:

Inspection at public stockyards

	<u>Fiscal Year 1950</u>	<u>Fiscal Year 1951</u>
Number of stockyards operating .....	48	49
Number of cities in which located ....	43	45
Animals inspected:		
Cattle .....	22,263,464	20,287,446
Sheep .....	14,305,409	12,036,367
Swine .....	<u>30,382,663</u>	<u>31,732,447</u>
Total animals inspected .....	66,951,536	64,056,260
Animals dipped and immunized:		
Cattle dipped .....	4,912	2,692
Sheep dipped .....	181,631	273,729
Swine immunized .....	<u>249,226</u>	<u>257,511</u>
Total animals dipped and immunized .	435,769	533,932
Health certificates issued for shipments .....	170,251	163,162
Infectious cars received .....	198	169
Cars cleaned and disinfected .....	1,735	1,653
Trucks cleaned and disinfected .....	2,103	3,518
Diseased animals detected (excludes those reacting to tests for tuberculosis and brucellosis) .....	7,448	19,801



Enforcement of Animal Quarantine Acts

Violations investigated by the Bureau .....	10	18
Violations referred to the Solicitor of the Department .....	0	12

These violations were fully investigated by the Bureau and fines amounting to \$125 and costs were imposed by the court in each of two cases. There was insufficient evidence in six cases to warrant prosecution and they were filed without action.

Reports of violations of the 28-Hour Law during the past fiscal year numbered 114. In addition, 21 reported violations were under investigation at the beginning of the year. Recommendations were made to the Solicitor of the Department for the prosecution of 192 cases, 79 were filed without action on information accompanying the report, and 119 were filed without action after investigation revealed that the cause of overconfinement excused the carrier. 15 cases were under investigation at the close of the year. Of the 192 court cases penalties aggregating \$18,950 were imposed by the courts covering 187 violations.

Control of Manufacture, Importation, Shipment and  
Marketing of Viruses, Serums, Toxins, etc.

Current activities:

Work covers enforcement of the provisions of the Virus-Serum-Toxin Act to insure that all veterinary biological products manufactured under license will accomplish the purpose for which intended; to prevent marketing of products that are worthless, contaminated, dangerous or harmful; and to control the importation and interstate shipment of disease organisms, thereby protecting the nation's livestock and poultry industries against impure and impotent biological products and dissemination of disease through the uncontrolled movement of disease organisms and vectors.

Under authority of Sections 56 to 60, inclusive, of the Act approved August 24, 1935 (7U.S.C. 851-855), the Secretary has entered into a marketing agreement with manufacturers and other handlers of hog cholera virus and anti-hog-cholera serum which provides for the maintenance of adequate stocks for the protection of swine producers. Regulations prescribed by the Department to prevent undue and excessive fluctuations in price, unfair methods of competition, and unfair trade practices are administered by a control agency representing the industry. The Bureau's work includes reviewing the acts of the control agency, assembling data on production, sales and prices, and conducting investigations.

Examples of Recent Progress:

- (1) Outstanding licenses under the Virus-Serum-Toxin Act permitted production of 104 different biological products as of June 30, 1951. Several products are manufactured in more than one form, so that the total number of different products was 181. The progress and anticipated extent of work under the project is reflected in the following table:

	: Actual : F.Y. 1951	: Estimated : F.Y. 1952	: Estimated : F.Y. 1953
(a) Establishments producing	:	:	:
anti-hog-cholera serum	:	:	:
and hog-cholera virus ..	35:	34:	34
Production (cc):	:	:	:
Serum (preserved	:	:	:
product) ..	1,762,053,000:	1,783,800,000:	1,605,420,000
Virus:	:	:	:
Simultaneous .....	106,610,400:	110,982,000:	99,884,000
Hyperimmunizing ...	347,842,200:	360,670,000:	324,603,000
Inoculating .....	1,738,500:	1,790,815:	1,611,000
Animal inspections .....	4,859,000:	4,997,500:	4,498,000
Tests supervised .....	17,200:	17,300:	17,300
(b) Establishments producing	:	:	:
hog-cholera vaccine .....	9:	12:	15
Production (doses) .....	6,862,700:	20,000,000:	25,000,000
(c) Establishments producing	:	:	:
other biologics .....	38:	38:	38
Production:	:	:	:
Cc .....	629,794,500:	656,816,000:	665,400,000
Milligrams .....	111,167,400:	122,485,000:	132,734,000
Disks .....	212,000:	150,000:	135,000
Units .....	480,154,900:	502,650,000:	540,200,000
(d) Products destroyed	:	:	:
(all kinds):	:	:	:
Cc .....	41,384,300:	50,265,300:	55,080,000
Milligrams .....	12,768,800:	14,029,700:	14,750,000
Disks .....	3,000:	3,300:	3,800
Units .....	16,125,000:	18,000,000:	18,573,000
(e) Export certificates issued.	988:	1,100:	1,100
	:	:	:

- (2) Violations of the Marketing Order with Respect to Hog Cholera Virus and Serum. Two companies were cited for violation of the Order. Both were investigated and an injunction obtained in one case to prevent further violations of the Order. The Control Agency, which represents the industry and representatives of the Bureau are continuing investigations and screening of all wholesalers under the Order to determine if those classified as handlers are continuing to conform to the requirements.



- (3) Control Agency. Several meetings were held with representatives of the serum industry relative to a problem of a variant in hog-cholera virus and to the effect of a proposed modified live virus hog-cholera vaccine.
- (4) The following table shows comparable figures by fiscal years of the number of handlers operating under the Marketing Agreement and Order:

	Actual		Estimated	
	1950	1951	1952	1953
Producer-Handlers .....	33	32	31	31
Distributor-Handlers or equivalent including Wholesale Purchasers and Handlers .....	259	262	250	250

#### MEAT INSPECTION

##### Current Activities:

Enforcement of the Federal meat inspection laws assures production of disease-free, clean, and wholesome meat and meat products for both civilian and military use and for foreign commerce. This is accomplished by supervising slaughtering and meat processing operations at meat packing plants, application of controls over imported meats to assure the same protection as in the case of meats produced domestically and a system of certification of meats for export to keep foreign markets open to American meats. Work is also performed on a reimbursable basis for other Government agencies to assure specification compliance in governmental purchasing.

##### Examples of Recent Progress:

- (1) Meat inspection volume increased in 1951. The total volume of meat inspection work expanded as a result of the substantial increase in the number of hogs marketed last year.

The scope of operations under the meat inspection laws is indicated by the following tables:

	1949	1950	1951
(at close of fiscal year)			
Number of establishments covered .....	928	928	1,004
Number of cities and towns in which.. establishments were located (at close of fiscal year) .....	364	363	387

Continued on next page



	1949	1950	1951
<u>Ante-mortem inspection:</u>			
Animals passed .....	83,220,393	87,476,433	88,435,213
Animals suspected .....	240,002	249,281	225,586
Animals condemned .....	6,540	6,820	6,262
Totals animals inspected ...	83,466,935	87,732,534	88,667,061
<u>Post-mortem inspection:</u>			
Carcasses passed .....	83,172,163	87,428,617	88,368,122
Carcasses condemned .....	286,623	295,221	291,124
Total carcasses inspected ..	83,458,786	87,723,838	88,659,246
<u>Inspection of animals by species:</u>			
Ante-mortem inspections (animals)			
Cattle .....	13,186,667	13,119,481	12,573,931
Calves .....	6,749,609	6,234,999	5,362,092
Sheep and lambs .....	13,895,500	12,247,510	10,728,566
Goats .....	262,064	122,240	77,951
Horses * .....	307,794	240,012	319,605
Swine .....	49,065,301	55,768,292	59,604,916
Total .....	83,466,935	87,732,534	88,667,061
Post-mortem inspections (carcasses)			
Cattle .....	13,182,962	13,115,889	12,570,825
Calves .....	6,749,001	6,234,261	5,361,363
Sheep and lambs .....	13,894,311	12,246,809	10,727,927
Goats .....	262,064	122,233	77,937
Horses * .....	307,785	240,010	319,601
Swine .....	49,062,663	55,764,636	59,601,593
Total .....	83,458,786	87,723,838	88,659,246

\*Horses are slaughtered and their meat is identified as such. It is handled and prepared in separate establishments from those handling cattle, calves, sheep, swine, and goats.

Meat and Meat Food Products Prepared and Processed  
Under Federal Inspection by Fiscal Years

<u>Fiscal Year</u>	<u>Pounds</u>
1946	12,250,086,608
1947	11,888,911,964
1948	12,610,658,151
1949	13,381,083,144
1950	14,146,903,556
1951	15,916,481,602

Examination of Meat and Meat Food Products for  
Other Government Agencies (Reimbursable)

Branch of Government	1949 (Pounds)	1950 (Pounds)	1951 (Pounds)
Department of the Navy .....	219,607,657	173,436,541	264,700,052
Commodity Credit Corp. (Supply programs) .....	- -	12,313,413	1,137,650
Coast Guard .....	1,383,266	745,977	178,727
Marine Corps .....	12,204	10,714	97,076
Department of Interior .....	5,536	28,204	12,191
Veterans Administration .....	3,824,310	4,937,609	3,701,504
Department of the Army .....	94,489	91,990	76,937
Maritime Commission .....	7,192	- -	8,621
Department of Justice .....	157,297	90,813	98,205
All others .....	30,944	51,279	63,985
Total .....	225,122,895 <sub>1</sub>	191,706,540 <sub>2</sub>	270,074,948 <sub>3</sub>

- 1/ Includes 2,184,396 pounds rejected.  
2/ Includes 1,858,679 pounds rejected.  
3/ Includes 3,538,216 pounds rejected.

Summary of Samples Examined in Laboratories for Determination of  
Adulteration or Other Objectionable Conditions, Fiscal Year 1951

	<u>Number Examined</u>	<u>Reported Adversely</u>
Meat and meat food products .....	15,026	2,277
Edible fats and oils .....	934	19
Binders (Cereal, dried skim milk, soya flour) .....	1,417	53
Curing materials .....	1,947	39
Water .....	2,453	116
Miscellaneous .....	1,841	116
Samples of animal foods .....	172	27
Imports .....	1,965	97
Seasonings (spices, flavorings, etc.) ..	4,823	80
Total .....	30,578	2,824



Meat and Meat Food Products Classified by Type of Product

Product	1949 Quantity (lbs)	Quantity (lbs)	Quantity (lbs)
Placed in cure:			
Beef .....	120,720,960	110,639,982	106,231,571
Pork .....	3,213,574,534	3,435,780,953	3,532,244,469
Smoked and/or dried:			
Beef .....	55,987,753	50,865,406	59,260,259
Pork .....	1,990,532,562	2,055,293,137	2,306,150,036
Sausage:			
Fresh finished .....	242,795,972	240,878,222	313,073,012
Smoked and/or cooked .....	961,851,503	961,719,027	1,003,139,455
To be dried or semi-dried ..	118,735,086	117,477,505	119,426,862
Loaf, headcheese, chili con carne, jellied products, etc. ....	180,369,664	177,679,181	192,208,995
Cooked meat:			
Beef .....	29,799,827	35,300,165	60,279,490
Pork .....	552,006,645	604,394,554	444,336,075
Canned meat and meat food products:			
Beef .....	107,112,944	93,522,249	296,697,662
Pork .....	469,894,388	532,835,662	604,175,876
Sausage .....	83,493,448	77,899,692	125,142,939
Soup .....	402,232,097	437,513,467	428,791,468
All other .....	425,945,237	402,635,605	428,303,386
Bacon, sliced .....	679,605,650	739,962,146	749,902,396
Lard:			
Rendered .....	1,680,868,655	1,871,395,554	2,010,030,294
Refined .....	1,354,200,766	1,340,627,407	1,499,953,242
Rendered pork fat:			
Rendered .....	90,387,324	108,571,605	102,353,574
Refined .....	54,840,402	58,201,056	53,539,620
Oleo stock .....	89,275,032	99,440,098	103,178,178
Edible tallow .....	75,697,290	66,642,581	75,156,165
Compound containing animal fat .....	202,775,520	237,856,460	286,518,083
Oleomargarine containing animal fat .....	26,390,268	22,510,055	21,006,993
Miscellaneous .....	91,065,049	228,758,118	927,786,214
Horse meat products:			
Cured .....	9,498,650	7,704,206	4,908,608
Chopped .....	25,274,771	27,951,791	41,792,780
Canned .....	43,108,666	7,067,033	17,169,023
Rendered fat .....	3,042,481	2,780,639	3,724,877
Total .....	13,381,083,144	14,146,903,556	15,916,481,602



Examination of Labels and Sketches,  
Fiscal Year 1951

Number of labels and sketches approved .....	23,911
Number of labels approved for imported meat .....	730
Number of labels and sketches refused approval .....	<u>2,683</u>

Total number of labels and sketches reviewed ..... 27,324

Inspection of Imported Meat and Meat Food Products

<u>Fiscal Year</u>	<u>Pounds</u>
1946	64,484,876
1947	57,832,177
1948	86,404,884
1949	254,519,299
1950	229,147,254
1951	342,259,142

- (2) Continued investigations of the prevalence of trichinae in swine showed that garbage-fed hogs are the main sources of human trichinosis. Approximately 10 percent of the garbage-fed hogs examined were found to be infected, whereas a fraction of 1 percent of hogs raised on the farms in Illinois, Indiana, Iowa, and Ohio harbored trichinae in exceedingly small numbers.
- (3) Adding to sausage meat solutions of nitrate in water and small quantities of wine, in accordance with the practices of certain meat processing establishments, did not influence in any way the destruction of trichinae in the meat. Accordingly, these practices were approved from the standpoint of meat inspection.
- (4) In examinations of edible parts of carcasses to detect parasites, nodular-producing worms were found which are believed to be comparatively rare in this country, so far as known at present. Significant infestation with these parasites can be a cause for condemnation.
- (5) During the past year approximately 600 cases of disease conditions in food animals slaughtered at abattoirs with Federal inspection were examined and diagnosed. The work on these cases usually involved histopathological studies, and frequently also bacteriological studies and animal inoculation tests. A wide variety of pathological conditions were diagnosed, including numerous malignant tumors and infectious diseases, among which were several types transmissible to man. Bacteriological tests of food products for spoilage and food poisoning organisms also were made.

It was found that laboratory examination of suspected tuberculous lesions in animals is essential because of the close "naked-eye" resemblance between tuberculosis and other diseases, like coccidioidomycosis, actinobacillosis, actinomycosis, corynebacterium pyogenes infection and miscellaneous fungus infections.



(b) Research Facilities

The Second Deficiency Appropriation Act of 1949 provided \$500,000 for preparing plans and specifications for laboratory facilities for research on foot-and-mouth disease and for acquiring an option on the site recommended. No funds have been provided for construction of the facilities. Expenses under the \$500,000 appropriation were \$44,302. The unobligated balance of \$455,698 has been placed in budget reserve pending final determination of its disposition.





STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Marketing Agreements, Hog Cholera:</u>			
<u>Virus and Serum, Agricultural</u>			
<u>Research Administration:</u>			
To provide for maintenance			
of adequate supplies of			
hog cholera virus and			
anti-hog cholera serum for			
the protection of swine			
producers .....	\$48,666:	a/ - -	a/ - -
<u>Agricultural Marketing Act (RMA-</u>			
<u>Title II) Agriculture (Bureau</u>			
<u>of Animal Industry):</u>			
Marketing research and			
service .....	23,328:	\$20,600:	\$19,600
<u>Working Fund, Agriculture, Agri-</u>			
<u>cultural Research Administra-</u>			
<u>tion (Bureau of Animal</u>			
<u>Industry):</u>			
<u>Advanced from Atomic Energy</u>			
<u>Commission:</u>			
For research on the			
metabolism of the			
embryo and the effect			
of internal radiations	20,431:	30,000:	- -
For research on effect,			
of radiations on			
chickens with special			
reference to egg pro-			
duction and other			
physiological factors	10,400:	29,648:	- -
<u>Advanced from Quartermaster</u>			
<u>Corps, Department of the Army:</u>			
For processing animals under			
Foreign aid program .....	- -:	50,000:	- -
Total, Working Fund, Agriculture,			
Agricultural Research Admin-			
istration .....	30,831:	109,648:	- -

(Continued on next page)

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
Inspection of Animal Foods,			
Bureau of Animal Industry,			
Agricultural Research Adminis-			
tration (Trust Fund):			
For inspection and certifica-			
tion of animal foods upon			
application of an inter-			
ested party, which service			
is financed by fees which			
are covered into the			
Treasury as a special trust:			
fund and made available for:			
the payment of expenses and:			
refunds in connection with:			
the work provided for under:			
cooperative agreements ...	\$99,785:	\$100,349:	\$100,000
Expenses, Feed and Attendants for:			
Animals in Quarantine, Depart-			
ment of Agriculture (Bureau of			
Animal Industry) (Trust fund):			
For expenses for feed and			
attendants for animals in			
quarantine at request of			
the importer which service			
is financed by fees which			
are covered into the			
Treasury as a special trust:			
fund and made available			
for expenses in connection:			
with the work .....	357:	3,718:	3,741
Total, trust funds .....	100,142:	104,067:	103,741
Obligations under reimbursements			
from Governmental and other			
agencies:			
Salaries and expenses .....	255,020:	335,500:	286,000
Meat inspection services ...	2,507,900:	3,223,300:	3,326,300
Agricultural Marketing Act .	1:	- -:	- -
Total .....	2,762,921:	3,558,800:	3,612,300
Total, Obligations Under Allot-			
ments and Other Funds .....	2,917,222:	3,793,115:	3,735,641

a/ This work is presently financed under "Salaries and Expenses, Bureau of Animal Industry, Agricultural Research Administration".



MEAT INSPECTION FUND

The 1948 Agricultural Appropriation Act established a working capital fund of \$5,000,000 for meat inspection services rendered by the Federal Government. That method of financing was repealed at the close of the year and financing by direct appropriation was restored for the fiscal year 1949 and subsequent years. As of June 30, 1952, it is planned that the uncollected receivables, estimated at \$64,497, will have been turned over to the General Accounting Office for collection and deposit into miscellaneous receipts of the Treasury.



PASSENGER MOTOR VEHICLES

The Budget estimates for fiscal year 1953 propose the replacement of 123 passenger motor vehicles, constituting approximately 15 percent of the total number of cars now owned and operated under the above appropriations. Approximately 90 percent of the passenger-motor vehicles now in operation are used in inspectional work on farms in rural districts, and many of them have mileage of 18,000 and upward a year. All the cars to be replaced in the fiscal year 1953 will have reached the point where they can no longer be economically kept in service and will be within the age standard. Their average mileage will be over 60,000.





BUREAU OF DAIRY INDUSTRY

Purpose Statement

The Bureau of Dairy Industry was established July 1, 1924, pursuant to the Act of May 29, 1924. Its activities comprise four broad areas of research, as described below, and enforcement of regulations governing the manufacture of process butter.

1. Breeding, feeding, and management of dairy cattle and the inter-relationship of conformation, internal anatomy, and mammary development to producing capacity.
2. Determination of the effect of nutrition on growth, health, reproduction and lactation, and the physiological processes affecting the usefulness of dairy cattle, including the vitamin requirements of calves, methods of evaluating forages, effects of renovation and rotations on pasture production, relation of nutrition to sterility, and the usefulness of grass silage in the ration of growing heifers.
3. Compilation and analysis of genealogical and production data on approximately 1,200,000 cows in 43,000 dairy herd improvement association herds to evaluate the genetic make-up of individual animals, particularly sires, in order that the hereditary influence of sires possessing an inheritance for high producing capacity may be disseminated to the general dairy cow population.
4. Determination of the physical and chemical properties of milk and milk products and the effect of variations in handling and processing procedures; the species of microorganisms in milk and their characteristics, action and control in dairy products manufacture; and the development of new and improved methods of manufacture and use of milk products and byproducts.

The Bureau of Dairy Industry conducts research in Washington, at six field stations, and at fourteen State Agricultural Experiment Stations. The staff employed on November 30, 1951, numbered 255, of whom 141 were stationed in the field.

	<u>Estimated, 1952</u>	<u>Budget Estimate, 1953</u>
Appropriated funds	\$1,573,000	\$1,621,000

Salaries and Expenses

Appropriation Act, 1952 .....	\$1,475,000
Anticipated pay adjustment supplemental.....	98,000
Base for 1953 .....	1,573,000
Budget Estimate, 1953 .....	1,621,000
Increase .....	<u>+48,000</u>

SUMMARY OF INCREASES AND DECREASES, 1953

For strengthening dairy herd improvement work, and to place it on a more nearly current basis .....	+50,000
Decrease due to partial absorption of pay adjustment costs .....	-2,000

PROJECT STATEMENT

Project	1951	1952 :(estimated):	Increase or decrease	1953 :(estimated)
1. Dairy cattle breeding, feed- ing and management .....	\$580,050:	\$561,800 :	-\$2,000 (2):	\$559,800
2. Nutrition and physiology .....	374,372:	373,300 :	-- :	373,300
3. Dairy herd improvement .....	296,626:	297,200 :	+50,000 (1):	347,200
4. Dairy products research .....	303,416:	316,700 :	-- :	316,700
5. Administration of the Process Butter Act .....	20,009:	24,000 :	-- :	24,000
Unobligated balance .....	15,027:	-- :	-- :	--
Total pay adjustment costs .....	-- :	[104,000]:	[+7,800]	: [111,800]
Total available or estimate ..:	1,589,500:	1,573,000 :	+48,000	: 1,621,000
Transfer in 1952 estimates to "Salaries and expenses, Office of Information, Agriculture" ..:	+500:	:	:	:
Reduction pursuant to Sec. 1214 :	+27,500:	-- :	:	:
Anticipated pay adjustment supplemental .....	-- :	-98,000 :	:	:
Total appropriation or estimate .....	1,617,500:	1,475,000 :	:	:



INCREASE AND DECREASE

(1) An increase of \$50,000 under the project "Dairy herd improvement" for strengthening the work, and to place it on a more nearly current basis.

Need for increase: The national Dairy Herd Improvement Association program is an invaluable aid to farmers in selecting superior breeding animals for use in improving the producing ability of their herds. This program has been, to a large degree, responsible for the favorable increases in production of the nation's dairy cattle during the past decade.

The Bureau of Dairy Industry plays the vital role of compiling and summarizing milk and butterfat production records of daughters of sires and their dams, received from dairy farmers through cooperating State agencies and provides the industry with proved sire information. The success of the entire Dairy Herd Improvement Association program depends to a large degree on the ability of the Bureau to maintain on a current basis the proved sire information. Artificial breeding associations and breeders alike are continually requesting that this information be made available on a current basis. Dairymen annually spend about 5 million dollars to support the testing program on their farms and in furnishing the production records to the Bureau of Dairy Industry for use in proving sires. The Bureau of Dairy Industry has not been able to keep the sire proving program on a current basis, mainly because the available personnel for doing the work has not kept pace with the greatly increased volume of records received from the States.

Work Load data: The total number of records received, the number of employees, the number of records per employee, and the number of sires proved for a period of years are listed below:

Calendar Year	Records receiving basic processing	Number of sires proved	Maximum employees available	Records per employee	Sires proved per employee (annually)
(1)	(2)	(3)	(4)	(5)	(6)
1943	149,000	3,101	54	2,760	57
1944	157,000	1,886	44	3,570	43
1945	138,000	1,618	37	3,730	44
1946	172,000	725	33	5,210	22
1947	266,000	3,820	92	2,890	42
1948	268,000	4,887	82	3,270	60
1949	374,000	4,355	71	5,270	61
1950	394,000	2,817	73	5,400	39
1951	523,000	2,400	68	7,690	35
1952 (Est)	649,000	1,800	58	11,190	31
1953 (Est)	550,000	4,000	75	7,330	53

Basic processing required: All records received first require certain basic processing to put them on a uniform basis prior to tabulation; this processing must be completed before proved sire records can be compiled. As a result, when insufficient personnel are available for the total job, a much larger proportion of total time worked is required for this basic processing, and a smaller proportion is available for the compilation of proved sire records.

A perusal of the above table, particularly for the period 1943-1948, clearly indicates this fact.

Personnel needs of the project: A detailed study of the clerical needs of the project, conducted some five years ago, disclosed that 95 employees were needed to handle the work load. The Congress provided an increase in funds in the 1947 Appropriation Act to hire approximately that number of people. As a result, it was possible to bring the work of proving sires up to date in a twelve-month period. Since that time, however, the number of production records received annually has continued to increase, while the number of personnel employed on the project has declined primarily because of absorption of pay act costs, within grade salary advancements and general reductions. Present funds permit the employment of only 58 people. As a result, the work of compiling proved sire records is about two years in arrears.

One factor which has kept the situation from becoming even more critical is the increased use of the latest available high-speed office machinery. Since maximum mechanization has now been achieved on this project, the possibilities of further increases in efficiency from this source are probably limited.

Present status of work: At present the work of compiling proved sire records is approximately two years in arrears. Processed data for proving about 6,000 sires are on hand and it is anticipated that during the current fiscal year records for proving 5,000 additional sires will be received. In addition, there are about 3,500 proved sire records that should be retabulated to include data reported since the sires were first proved.

The proposed increase will provide for the employment of approximately 17 additional clerks, which will aid materially in bringing the work of compiling proved sire records to a current basis.

(2) A decrease of \$2,000 under the project "Dairy cattle breeding, feeding, and management" due to partial absorption of pay adjustment costs.





## STATUS OF PROGRAM

Current Activities: The Bureau conducts specialized research pertaining to dairy cattle, milk and milk products. It cooperates with State and other Federal agencies, and with individuals and organizations in the dairy industry, including processors of milk and milk products. Major phases of the research program include:

1. Research in dairy cattle genetics, including investigations to determine the relative usefulness of various systems of breeding in improving milking, reproductive, and disease resistant qualities; feeding and management studies; anatomical studies to determine relationships between physical characteristics and milking ability; growth and development studies based on body weight and skeletal measurements; and methods of selecting profitable producers at an early age. Physiological reactions of dairy animals to extreme temperatures are also being determined to aid in improving dairy cattle in the Southern sections by breeding.
2. Research in dairy cattle nutrition and physiology to develop methods leading to the economical production of milk. Such research includes the evaluation of feeds and feeding regimes, the nutritional requirements of cattle, feeding procedures and other factors affecting the milk producing capacity of dairy cows, and of the nutritional value of milk as well as the relation of the nutrition of the cow to the nutritive qualities of the milk produced.
3. Research in the basic principles of sanitary milk production and handling to preserve the palatability and nutritive and sanitary qualities of milk and to improve the quality and reduce the cost of manufacture of dairy products; to develop the domestic manufacture of dairy products; and to increase the utilization of milk products and byproducts in foods.

The Bureau also demonstrates at regional dairy experiment stations the dairy practices applicable to such regions, and conducts a National Dairy Herd Improvement Program in cooperation with the State extension services to improve the producing efficiency of dairy cows by applying the results of research in dairy cattle breeding, feeding, and management. The average production of the 1,200,000 cows in Dairy Herd Improvement Association herds is approximately double the average production of all cows in the national dairy herd. Among the projects now being conducted, the following are selected as typical:

1. Evaluation of outbreeding, inbreeding of various intensities, proved sire breeding, and crossbreeding in improving the milk producing qualities of dairy cattle.
2. Determinations of the reactions of dairy animals to heat stress and causes of severe declines in milk production.

3. Studies on evaluation and utilization of the nutrients of forage crops by dairy cattle.
4. Experiments to determine the vitamin B<sub>12</sub> activity of various dairy products.
5. The effect of spraying forage crops with insecticides on the concentration of the insecticides in milk when cows are fed the sprayed forage.
6. To determine the cause for and to develop means of preventing the development of the common defects in body, color, and flavor in stored condensed and evaporated milks.
7. Development of methods of processing and determination of the conditions of handling and storing normal and concentrated milks in liquid or frozen condition.
8. Development of methods for the manufacture of foreign-type cheeses, i.e., Swiss, Roquefort, brick, and Italian types, especially from pasteurized milk.
9. Development of new forms of and new uses for milk byproducts in ice cream, sherbets, and bakery products.

Selected Examples of Recent Progress:

1. Standards for growth and weight developed for Holsteins and for Jerseys provide a basis for evaluating results obtained in experimental and practical work in the breeding, nutrition and management of dairy cattle.
2. At comparable ages, stages of lactation and size, Red Sindhi crosses have been found to change less in body temperature and respiration rate than Jerseys or Holsteins when exposed to high temperatures, indicating a higher heat tolerance. At 105° F. and 60 percent relative humidity, the respiration rate increased to 140 per minute in Jerseys, but to only 120 in Red Sindhi crosses. Corresponding elevation of body temperature was 4° F. for Jerseys and 2° F. for Red Sindhi crosses.
3. Using rats as experimental animals it was found that milk and milk products containing adequate amounts of B<sub>12</sub> will prevent abnormalities such as decrease in birth weight, a high early infant mortality, subnormal growth rate, and delayed sexual maturity.
4. Calves fed a synthetic (semi-purified) milk had much lower blood vitamin A values but storage of this vitamin in the liver compared favorably with that of normally fed calves. Some unknown factors apparently control the level of vitamin A in the blood.



5. Good quality brome grass-ladino clover, or orchard grass-ladino clover hay mixtures may replace alfalfa hay in the ration of dairy heifers when corn silage and a limited grain allowance make up the rest of the ration.
6. Holstein heifers allowed free choice of both alfalfa hay and alfalfa silage consumed about equal amounts of dry matter from each at three months of age, but at six months of age they consumed four times as much dry matter from the silage, indicating that the appetite for silage increases with age.
7. Increased yields, improved distribution of nutrients, and economy in the production of feed nutrients was achieved by renovating permanent pastures by means of tillage, the application of fertilizer, and seeding to high-yielding grasses and legumes.
8. Cows fed thyroprotein (a synthetic hormone) during a full lactation period did not produce more milk than cows fed at the same level without the hormone.
9. A new technique for determining the amount of feed digested by animals has been found satisfactory.
10. Dehydrated pelleted alfalfa promoted greater growth and a greater storage of vitamin A in calves from birth to 105 days of age than field-cured alfalfa hay.
11. Lindane and DDT were detected in the milk of cows fed hay that had been field-sprayed with recommended amounts of these insecticides for insect control and harvested 10 to 14 days later. The milk of cows fed forage harvested 7 to 10 days following field-spraying with recommended amounts of chlordane, toxaphene and methoxychlor did not disclose the presence of these insecticides. Lindane excreted in cow's milk gives a pronounced off-flavor when present in sufficient concentrations.
12. A technique for determining the enzyme phosphatase and glycogen (sugar) in the reproductive tract of dairy cattle has been developed as an aid in studying causes of infertility.
13. Ascorbic acid deficiency does not appear to be a factor in the fertility of cows.
14. Underfeeding delays the onset of sexual maturity in both heifers and bulls. Overfeeding speeds up the onset of sexual maturity.
15. Silage preserved in gas-tight, glass-coated steel silos lost considerably less dry matter than silage stored in conventional silos.

16. Spray-dried whole milk was found to contain the equivalent of about 38 micrograms of B<sub>12</sub>, indicating there is no destruction of B<sub>12</sub> in the drying process.
17. No significant differences were found in the B<sub>12</sub> concentration of milk pasteurized by the holding method (143° for 30 minutes) or the so-called flash method (160° for 15 seconds).
18. 1,186,615 cows in 42,949 herds are on test in dairy herd improvement associations in 1951, representing the largest number of cows and herds ever enrolled in the DHIA program. The average butterfat production of DHIA cows is 370 pounds compared to 211 pounds for all cows of the Nation.
19. 2,817 sires were proved in dairy herd improvement associations in 1950. Their daughters produced an average of 9,856 pounds of milk and 405 pounds of butterfat as compared to 9,761 and 397 pounds of milk and butterfat, respectively, in 1949. Over one-third of sires proved during 1950 had daughters whose average butterfat production exceeded 425 pounds in 1951.
20. 2,102 sires were used in artificial breeding associations, of which 36.4 percent had 5 or more daughters with DHIA production records. These daughters produced an average of 443 pounds of butterfat.
21. Cow's milk concentrated in the ratio of 3 to 1 can be reconstituted to a satisfactory beverage provided it has been frozen and maintained at a temperature of -10° F. or lower. While the physical condition will remain satisfactory for a year or more, the flavor will remain satisfactory for a shorter period of time. Goat's milk can be preserved from the flush season to the season of low production by freezing and storage under similar conditions. It remains satisfactory in texture and flavor for a longer time than does cow's milk.
22. The process originally devised for utilizing the proteins from whey by isolation and processing through the action of an enzyme to give a product of suitable smoothness and agreeable flavor for use in the manufacture of spreads, cheese foods, and similar products was found to be applicable only to Swiss cheese. A modification of the procedure has now been devised for using Cheddar cheese whey for the same purposes. The use of these proteins should increase the monetary return for cheese milk and avoid waste through more efficient utilization of milk constituents.
23. An improved procedure for making brick cheese has resulted in a more satisfactory and uniform product.

24. The use of whey in the manufacture of sherbets provides for the utilization of a portion of a byproduct of the cheese industry and improves the quality of sherbets by imparting a richness and smoothness not obtainable with the usual ingredients.

Receipts from Sales of Dairy Products and Animals  
(Deposited in Miscellaneous Receipts of the Treasury)

<u>Fiscal Year</u>	<u>Receipts</u>
1947	\$157,802
1948	149,082
1949	128,328
1950	109,862
1951	149,730



STATEMENT OF OBLIGATIONS UNDER ALLOTMENT AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Agricultural Marketing Act (RMA-</u>			
<u>Title II), Agriculture (Bureau</u>			
<u>of Dairy Industry):</u>			
Marketing research and services	\$52,771	\$19,000	\$19,000
<u>Obligations Under Reimbursements</u>			
<u>from Governmental and other</u>			
<u>agencies:</u>			
For dairy herd improvement ....	834	1,000	1,000
TOTAL OBLIGATIONS UNDER ALLOT-			
MENT AND OTHER FUNDS .....	53,605	20,000	20,000

BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY

Purpose Statement

The Bureau of Agricultural and Industrial Chemistry as now constituted was established in 1943, continuing research work conducted for many years by predecessor organizations. A Bureau of Chemistry existed in 1901 and the Congress had appropriated funds for chemical analyses of agricultural products as early as 1848.

The Bureau conducts research in the field of chemistry and related physical sciences on utilization of agricultural commodities, residues, and byproducts in the creation of improved foods, feeds, drugs, fabrics, industrial chemicals and other nonedible products.

Four regional research laboratories, one in each of the major farm producing areas, provide facilities for investigations to develop new and expanded industrial and food uses for the principal farm commodities of their respective regions:

Southern Laboratory New Orleans, Louisiana	Cotton, rice, peanuts and other oil seeds, sugar and sweet-potatoes.
Western Laboratory Albany, California	Fruits, vegetables, poultry products, alfalfa, wheat, rice, sugar and wool.
Eastern Laboratory Wyndmoor, Pennsylvania	Vegetables, tobacco, fruits, uncultivated plants, milk products, animal skins, hides and tanning materials, animal fats and oils, honey, and maple sugar.
Northern Laboratory Peoria, Illinois	Corn, wheat, and other cereals, such as oats, rye and barley, soybeans and other oilseeds, sugar, and agricultural residues.

This decentralized operation also facilitates contact with food processors and other industry groups. In 10 smaller field stations of the Bureau applied research is being directed toward the problems of processing and utilizing the products and byproducts of pine gum, tung nuts, sugar plants, citrus and other fruits, and vegetables. Fundamental research is conducted on the nature and control of enzyme action, on the toxic and other physiological effects of substances that might be considered for medicinal uses or that contaminate or exist in foods and feeds, and on substances that exhibit special biological activity in or toward plants.

Employment as of November 30, 1951, was 1314, of which 55 were in the headquarters office in Washington, and the balance in the field.

	Estimated, 1952	Budget Estimate, 1953
Appropriated funds	\$7,500,000	\$8,400,000

Salaries and Expenses

Appropriation Act, 1952 .....	\$7,250,000
Anticipated pay adjustment supplemental .....	450,000
Base for 1953 .....	7,700,000
Budget Estimate, 1953 .....	7,689,000
Net decrease .....	<u>-11,000</u>

SUMMARY OF INCREASES AND DECREASES, 1953

For development of products from pine gum (pine oleoresin) for critical military uses .....	+50,000
Decrease due to partial absorption of pay adjustment costs.	-61,000

PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase or decrease	1953 (estimated)
1. Cereal and forage crop				
utilization investigations:	\$1,311,952	\$1,229,833	-\$13,100(2)	\$1,216,733
2. Cotton and other fiber				
utilization investigations:	1,177,232	1,239,559	-17,000(2)	1,222,559
3. Fruit and vegetable				
utilization investigations:	2,111,439	2,029,789	-14,900(2)	2,014,889
4. Oilseed utilization				
investigations .....	1,129,069	1,089,657	- -	1,089,657
5. Sugar and special plants				
utilization investigations:	601,513	787,901	+50,000(1)	837,901
6. Poultry, dairy and animal				
products utilization				
investigations .....	1,093,842	1,082,284	-16,000(2)	1,066,284
7. Agricultural residues				
utilization investigations .....	242,331	240,977	- -	240,977
Unobligated balance .....	162,622	- -	- -	- -
Total pay adjustment costs.	<u>7- -7</u>	<u>503,900</u>	<u>+12,800</u>	<u>516,700</u>
Total available or estimate .....	<u>7,830,000</u>	<u>7,700,000</u>	<u>-11,000</u>	<u>7,689,000</u>
Reduction pursuant to Sec. 1214 .....	+130,000	- -		
Anticipated pay adjustment supplemental .....	- -	-450,000		
Total appropriation or estimate .....	<u>7,960,000</u>	<u>7,250,000</u>		



## INCREASE AND DECREASE

The net decrease of \$11,000 in this item for 1953 consists of the following:

- (1) An increase of \$50,000 for the development of products from pine gum (pine oleoresin) for critical military uses:

Need for Increase. With the rapid development of the turbojet engine for military purposes (aircraft and guided missiles), it has been necessary to develop suitable special-type lubricants adapted to use under the extreme ranges of temperature encountered in the operation of such engines. Lubricants for this purpose have heretofore been made generally from sebacic acid, a derivative of castor oil. This country has been almost entirely dependent on foreign sources for its supply of castor oil. The possibility of a shortage of this oil under emergency conditions has stimulated research to develop replacements for certain of its important end uses from readily available domestic raw materials. In this research, various products developed from domestic raw materials were tested and found to be equal to and in many cases superior to the products that had been obtained from castor oil. Of the material studied, pine gum seems to offer a very acceptable source of replacements for such products. These replacements along with replacements derived from other raw materials have been examined and evaluated by the Naval Research Laboratory. Based on this evaluation, they have recommended that the work on development of turbojet lubricants from pine gum should be expedited with a view to developing as soon as possible acceptable commercial methods for the production of such lubricants. The work to date has necessarily been confined largely to exploratory laboratory studies.

A wide adoption of the turbojet engine would require tremendous amounts of these special turbojet lubricants. The use of pine gum would broaden the field of available raw material and because of the relatively low cost of the gum would make possible the production of these lubricants at prices below those of some of the synthetic lubricants now available.

In addition, with the wide use of plastics for military purposes, there is a continuing need for improving, and extending the range of use of the various plastics available. This requires development of plasticizers to impart desired characteristics (flexibility and durability) to the improved plastics which are being developed. Preliminary evaluation by the Naval Research Laboratory of certain pine gum derivatives has indicated that plasticizers can be made from pine gum which may be superior to those currently available.

The development from pine gum of acceptable turbojet lubricants and premium plasticizers would have two major purposes:  
(1) our dependence on foreign sources of supply for needed

raw materials for these products would be greatly reduced; and (2) a new outlet would be provided for the products of the gum naval stores industry. It is upon the development of such new industrial outlets that the future of the pine gum industry largely depends.

Plan of Work. Laboratory studies are currently under way at the Naval Stores Station, Olustee, Florida, on methods for the production of olustic acid (an intermediate for preparing special lubricants and plasticizers) from pine gum, which can serve as a base for these special lubricants and plasticizers. In order to develop as quickly as possible suitable commercial methods for the production of olustic acid, this work would be expedited. Starting with selected components of pine gum, various methods for the production of the acid would be explored and evaluated as to yield, cost, and ease of production. From the olustic acid a number of derivatives which it is believed would be useful as turbojet lubricants or plasticizers would be produced and sent to the military agencies for evaluation. Also, when the results of this development are made known to industry there should be a sufficient amount of the material available to supply the small quantities needed for evaluation by industry.

(2) A decrease of \$61,000 due to partial absorption of pay adjustment costs under Projects 1, 2, 3, and 6 which will be met by adjustments in investigations as follows:

(a) Elimination of projects:

- |  |         |
|--|---------|
| 1. Chemical laboratory studies of suitability of denaturants for alcohol fuels ..... | -7,500  |
| 2. Production of edible mushroom products by vat fermentation .....                  | -14,900 |
| 3. Investigations on the fractionation of wool grease .....                          | -15,600 |

(b) Curtailment of projects:

- |   |         |
|---|---------|
| 1. Fundamental and practical studies on corrosion of metals by agricultural motor fuels and on corrosion inhibitors ..... | -5,600  |
| 2. Cotton fiber fineness as related to processing techniques and physical properties of resultant textiles .....          | -17,000 |
| 3. Chemical investigations of the constituents of wool grease .....   | -400    |



## STATUS OF PROGRAM

General: The Bureau is cooperating actively with the Department of Defense, Agricultural Experiment Stations, farm cooperative groups and industrial concerns in prosecuting vigorously research on production of materials necessary for military and essential civilian needs from agricultural commodities. Among the research activities of especial importance are: (a) those designed to provide concentrated foods of enhanced quality and logistic economy; (b) those designed to provide fabrics having specialized properties, for example, flameproof cotton fabrics urgently needed in warfare where flame plays an ever-increasing role; (c) those designed to provide products indispensable to the physical well-being of military personnel, as well as civilians, in time of emergency, for example, dextran, a substitute for plasma; (d) those designed to make available, from agricultural sources, such urgently needed industrial products as global grease, a lubricant unaffected by extremes of temperature. These researches also contribute materially to the normal peacetime objective of the Bureau which is to provide increased and improved outlets for agricultural commodities thereby improving the farmers' economic situation. The research is carried on in four Regional Research Laboratories and ten smaller field laboratories.

### Selected Examples of Problems to Which Efforts Are Now Being Directed Are:

1. Improved process needed for making dextran, a plasma substitute - Dextran is a starch-like substance which, in certain forms, is useful as a substitute for plasma. In view of the urgent need from the viewpoint of military and civilian security, research designed to develop an optimum product at a practicable cost is underway. The work has already made available the only substitute the military finds of use. This research is being vigorously advanced as it is imperative that a thoroughly acceptable form and process be developed. This has not yet been accomplished.
2. Vitamins and antibiotics - The value of vitamin B<sub>12</sub> as a feed supplement is receiving increasing recognition, and the Bureau has discovered three processes for producing it from agricultural materials. Addition of dried fermentation product to feeds has made swine and poultry rations of greater value and efficiency. However, more efficient methods of production are desired. To effect this, advantage will be taken of information acquired in the Bureau's research whereby increased yields in the production of this material by fermentation has been obtained with new microorganisms. In addition the presence of vitamin B<sub>12</sub> has been discovered in the bacterial sludge from milk waste treatment. It has been found possible by the use of specific methods to produce an antibiotic simultaneously with the production of the vitamin.
3. Improved methods sought for flameproofing cotton fabrics - Never before in military history has the need for flameproofed cotton fabrics been so great. Although advances have been made in recent years in flameproofing treatments, further improvements are essential to reduce the number of casualties caused by the extensive use



of fire in modern warfare. To help solve this important defense problem, an extensive program of chemical research on fire-resistant cotton fabrics has been undertaken by the Bureau to meet the indicated needs of the Quartermaster Corps. The objective is to develop practical treatments of reasonable cost which remain effective after laundering, yet do not weaken the material or cause stiffness, stickiness, or other objectionable changes.

4. Evaluation of new high-strength cottons for defense products - Some of the new strains of cotton being developed by plant breeders are much stronger than any now commercially available. The high strength of the fiber greatly enhances its usefulness in important industrial and military products such as belting and tire cord, marine cordage and nets, tarpaulins and tentage. Because a vast amount of research must be done to show how these cottons can be used to greatest advantage, the National Cotton Council and Federal and State Agencies are working together to shorten the time required for commercial introduction. As a part of this coordinated program, the Bureau is utilizing its pilot-plant facilities to determine optimum procedures for utilizing the new cottons in specific end products of special interest to the armed forces.
5. Improvement in the quality of cotton products through control of neps (small tangled knots of cotton fibers) - Neps have long been a source of trouble in the manufacture of cotton yarns and cloth. Their occurrence in appreciable numbers detracts from the appearance and lowers the quality. Two lines of work are under way to aid the industry in reducing losses due to neps: the development of a test by which the tendency of a particular lot of cotton to form neps may be determined quickly; and processing studies to establish optimum settings and speeds of the opening, picking, and carding equipment for different qualities of cotton during the manufacture of goods.
6. Concentrated foods needed for military and essential civilian use - In close cooperation with the Quartermaster Corps research is in progress to make available to the Armed Forces stable concentrated foods not only reduced in weight and bulk but enhanced in quality and in ease of preparation for consumption. Such products are indispensable in the conduct of military operations at great distances but they also have a great potential in peace time civilian markets, as has been demonstrated, for example, by frozen citrus concentrates. Present Bureau research looks toward further economies in weight and bulk of citrus as well as apple, grape and tomato juice concentrates without sacrifice of fresh quality and perhaps with sufficient stability without freezing. Samples of such foods have been received enthusiastically, as have dehydro-frozen vegetables for use in military activities where the morale value of excellent food is as important as the saving of space. Experiments designed to reduce citrus and other fruit juices to dry powders reconstituting to full flavored juices are showing promising results. Dehydrated mashed potato, a powdered product developed toward the close of World War II, is well received by the

military and is being improved through Bureau research to meet Armed Forces needs. Further needed work is being undertaken to provide dry sweetpotatoes of adequate quality and work is being initiated on the dehydration of peas, snap beans, lima beans and sweet corn, four of the most acceptable of vegetables not heretofore available in this light and compact form. Technologic as well as engineering research is in progress to perfect the representative but not exhaustive list of products given herein. Frequent conferences with military and industrial representatives keep the research in strict accord with needs.

7. Cottonseed meals of improved nutritional value, produced in co-operation with the cotton oil industry by suitable modification of the screw-press process, are being evaluated in feeding trials by an increasing number of federal, state, and industrial research organizations in what has become the most extensive coordinated program of research ever undertaken on cottonseed meal. The findings are pointing the way to unrestricted utilization of the meal as the protein supplement in hog and poultry rations, as well as in feeds for cattle. Further investigations are directed at development of practical processes for production of cottonseed meals of equally high growth-promoting value by all methods of oil extraction, whether hydraulic pressing, screw pressing, solvent extraction, or combined pressing and solvent extraction, without impairing the yield or quality of the oil. Success in improving the nutritive value should prove equivalent to extending the supply of cottonseed meal by 10 to 25 per cent, an achievement that would be worth millions of dollars annually. Since the need for protein supplements for feeds and foods is unusually great in emergency periods, the procurement of new knowledge of practical value on cottonseed meal is now particularly timely.
8. Flavor instability remains major soybean oil problem - The search for means to prevent the development of undesirable flavors during aging of refined soybean oil continues to be a primary concern of the industry. Recent research has shown that (a) one of the minor components of soybean oil (linolenic acid) is a major cause of off-flavor development; (b) traces of copper and iron in the oil increase the rate of off-flavor development; (c) certain chemicals, most promising among which is phytic acid, a substance present in many cereals, act as superior flavor stabilizers for the oil. This research is being continued and application of the facts now known is being actively investigated so that fuller advantage can be taken of soybean oil in food products now needed for military and essential civilian use.
9. Flexible, edible fat products needed for coating foods and rations. New coating fats that combine edibility, flexibility, and non-greasiness are needed by the military for application to ration items that must stand extremes of temperature and storage. Fundamental and applied research is being conducted to modify available fats to produce such coating materials. Success in these efforts



will not only be of immediate aid to the military but will afford improved coatings for cheese, dressed meats, poultry, ice cream bars and other civilian food items.

10. Turpentine-derived chemicals can replace critical materials now obtained from imported castor oil - Several important military items, i. e., lubricants for turbojet aircraft engines, tough filament nylon, and premium plasticizers, used to make plastic sheets and films flexible at low temperatures, are made by chemical methods from castor oil. Because castor oil is largely imported it is essential to find a method of making these essential military items from domestic raw materials. The Bureau, working cooperatively with the Naval Research Laboratory, has succeeded in making, by laboratory methods, turbojet lubricants and premium plasticizers from domestic turpentine. Work is under way to improve the laboratory methods so that the lubricants, premium plasticizers, and similar military items can be made commercially at reasonable cost.
11. Investigations on the milling and processing behavior of new varieties of domestic sugarcane are now in their second season. New high-yielding, disease-resistant canes have been made available to replace older varieties, but information has been lacking on the variations in processing behavior and recovery of sugar and the relation between these properties and chemical composition of the different canes and their juices. The industry needs such information to guide efficient processing of the new varieties, and breeders need it to guide their efforts in further improvement of canes.
12. Sugarcane bagasse for paper fiber and feed - The residue left after pressing the juice from sugarcane is known as bagasse and much of it is burned as fuel. A new mechanical wet-pulping method has been demonstrated in the laboratories effecting a nearly complete separation of the bagasse fibers from the pith. The separated, pith-free fiber is being studied for use as high-grade paper pulp and the properties of the pith fraction are under investigation as a carrier for molasses, another byproduct of the cane sugar industry, offering molasses in a more marketable form for feed. Cooperative work is underway with industry.
13. Basic knowledge for improvement of beet sugar extraction process. Study of sugar beet diffusion juices from nine factories representing the principal sugar beet producing areas identified the non-nitrogenous organic acids which are extracted from the beet along with the sugar. Organic acids serve as impurities and have a deleterious effect on the crystallization and therefore the total yield of sugar. Identification is basic to a more rational approach to the development of improved procedures for producing beet sugar.



14. Cortisone - Work was undertaken during the past year in cooperation with the Bureau of Plant Industry, Soils, and Agricultural Engineering and the National Institutes of Health to discover plant sources of raw materials from which cortisone can be more easily synthesized in the quantities needed for the treatment of rheumatoid arthritis. Although the chemical assay for these plant substances is complex, procedures have been developed which permit the examination of about fifty samples each week. So far over one thousand plant samples from a large number of species have been examined. Two substances (plant steroids) which can serve as the starting material for synthesis have been found in small quantities. Attention is now being focused on the examination of plant species closely related to those containing these cortisone precursors.
15. Improved stability of dried eggs under military conditions. Large quantities of dried egg were produced and used to advantage during World War II, but it is recognized that this product was deficient with respect to flavor quality and stability in storage. Since World War II, improvement of dried eggs has been and still is an important problem facing those who are responsible for securing highest quality foods for the armed forces. Recent research has developed facts which have been successfully applied commercially for the production of dried egg of vastly improved quality and keeping characteristics. These fundamental and applied studies are being continued in close association with the Quartermaster Corps so that quality can be further improved and storage life further extended.
16. Better detergents needed. Synthetic detergents (soaplike products) have practical advantages over ordinary soaps, especially in hard-water areas. Not all synthetic detergents, however, combine in one chemical the two primary requisites of a cleansing agent, namely, (a) the ability to loosen dirt and (b) the ability to keep the dirt in suspension so that it is readily rinsed away. Synthetic detergents based on animal fats as the primary ingredient combine both of these properties. Research is being directed to the development of practical detergents of this type to facilitate military and essential civilian cleansing operations.
17. Edible fat spread needed for military use in both tropic and arctic regions - A stable, edible, fat spread which retains the best qualities of high-score butter in a temperature range from sub-zero to desert heat is desired by the Department of Defense. Such a spread should also have high stability on storage under adverse conditions. Work on the formulation and evaluation of such spreads is underway and promising results are being obtained on some phases of the problem.
18. Enzyme from red blood cells needed for military research - An enzyme (choline esterase) is essential to the transmission of nerve impulses in all animals. It is this enzyme which is affected

by the new "nerve-block" war gases. Quantities of the purified enzyme are needed by the military for their research on the war gases. The most available source of the enzyme is red blood cells but no process now exists for isolation of the enzyme from this material. Research is now underway to develop such a process.

Selected Examples of Recent Progress:

1. Alcohol-water injection tested in military transport vehicles: Completion of recent tests in cooperation with the Army Ordnance Department at Aberdeen Proving Grounds indicated clearly that alcohol-water injection in combination with straight-run gasoline (67 octane) gave a performance superior to that of an Army prototype fuel (83 octane, high sulfur) such as might be available in a national emergency. The trucks were run on 100 per cent overload on paved and gravel roads as well as on difficult cross-country terrain. With the Army test fuel the truck engine suffered two engine failures in less than 10,000 miles, while the trucks operating on straight-run gasoline with alcohol-water injection continued operation without trouble. Final inspection showed that the engines operating on alcohol-water injection were decidedly cleaner than the one running on the prototype fuel. These tests, jointly financed by the Ordnance Department and the Bureau under research contract authority, were so successful that the Army suggested further work along this line.
2. Dry-cell batteries to withstand extreme subzero weather in military use have been assured through development of a substitute for sweetpotato starch which previously was considered indispensable in commercial production of low-temperature batteries to meet the rigorous requirements of the Signal Corps. Commercial production of starch from sweetpotatoes, by processes developed earlier by the Bureau, ceased in 1947 because prices did not favor use of the vegetable as an industrial raw material. The problem of a continuing source of a satisfactory starch for low-temperature dry cells resulted and became acute with the recent growth of the national emergency. A suitable mixture of plentiful domestic starches was found to have the properties needed. This mixture proved successful in commercial production of the batteries.
3. Expanding commercial development of allyl starch: Several years ago methods were developed for the production of a new starch compound. This new product has potential utility as a coating material. Based upon its pilot-plant tests, a large manufacturing concern is constructing a plant with plans for still further expansion within a year.
4. Starch film similar to cellophane is made: A new transparent film has been made from a fraction of starch which is present in amounts of 25-30 per cent in corn and other cereal starches. Tests show that its physical properties, dry strength, flexibility, and tear resistance, etc., are within the range of present commercially-used



films such as cellophane. Since the film is made from the food product, starch, the film is also digestible in the body. This property combined with its good physical properties developed immediate interest in the film by meat packers, food companies, two national associations of grocers, and starch manufacturers. The production of known transparent wrapping films has not kept up with demand. Starch is lower in cost than most raw materials used in making films. Furthermore, starch is an annually produced farm commodity. These circumstances, coupled with the fact that the amylose film is edible, led potential industrial users and manufacturers to set up cooperative studies with the Bureau to seek early production and use of the starch film.

5. New cotton opening machine is now in commercial use: It was reported last year that several equipment manufacturers had applied for licenses to produce this opening machine. Of the 6 concerns now licensed under the Bureau patent, 3 have built and sold machines, and 3 others are building them for production tests to evaluate commercial practicability. These machines are selling for about \$5,000 each and one mill has reported that the machine will pay for itself many times during the first year of operation. Advantages gained by the opening and fluffing action of the new machine include reduction in spinnable fiber lost as waste and improved cleaning of the cotton particularly with the more trashy cottons obtained by mechanical harvesting.
6. Cotton mills installing new loom attachment: The improved attachment reported last year has been simplified to the point where it now costs only about \$100 for parts and installation. Within a few months after the plans and specifications for the simplified attachment were released, 10 mills and 2 textile equipment manufacturers reported they were building the device for production tests. The attachment not only makes it possible to weave extra tight fabrics for special purposes, but also to produce fabrics of normal density with better appearance, fewer defects, and higher strength than similar fabrics woven without the attachment.
7. Cotton to obtain a larger share of the market for bagging: Tests were made showing that dyed and printed cotton cloth used to bag commercial fertilizer have excellent reuse value for clothing and household articles. It was demonstrated that neither the strength nor the color of the cloth would be damaged by contact with the fertilizer in normal handling. On the basis of these results the Textile Bag Manufacturers' Association and the National Cotton Council have proceeded with promotional plans to encourage the use of sheeting in fertilizer bags. In 1950 fertilizer bagging took 13,800 bales of cotton, but the potential market is estimated at 180,000 bales.
8. Cotton shade cloth resistant to weathering is in commercial production: The lead chromate treatment recommended by the Bureau more than doubles the useful life of shade cloth while increasing the cost by only 10-15 per cent. Cotton shade cloth for tobacco



fields costs \$500-\$600 per acre. Treated samples put on test in Florida tobacco fields in 1948 have been used for three full seasons as top cover and could be used a fourth season as wall cover. In contrast, untreated cloth lasts only one season as top cover and one more as wall cover. With this decrease in the annual cost per acre it is anticipated that a much larger acreage will be covered with cotton cloth.

9. Improved felting of wool: It has been found that wool treated with propiolactone, a commercially available chemical, has markedly improved felting properties. The treatment is simple, the chemical moderate in price and the treated wool requires considerably less mechanical manipulation than wool felted by present methods. This important discovery has been demonstrated under practical milling conditions in at least four large wool processing plants.
10. Frozen apple juice concentrate: In cooperation with the Washington State apple industry, a pilot-plant scale investigation was conducted on the manufacture of frozen apple juice concentrate from apples considered unsuitable for fresh market because of pale color or small size. About 40,000 six-ounce cans of the concentrate were prepared and used in a market test carried out by the industry in cooperation with the Bureau of Agricultural Economics. Estimates have been made on the cost of manufacture of the concentrate. On the basis of this work the Washington State apple industry is developing plans for commercial production of frozen apple juice concentrate.
11. Full-flavored grape concentrate: Methods developed several years ago for the recovery of fruit essences in concentrated form continue to be important in the fruit processing industry and now have special implications in the manufacture of new products for use by the Armed Forces. Since grape juice has such high appeal to submarine crews, efforts have been devoted to the preparation of a superconcentrated, full-flavored grape juice concentrate. In collaboration with supply officials of the Navy, a 7-to-1 grape concentrate was developed and is being evaluated under actual fleet operating conditions by submarine crews.
12. Apple sherbet: In cooperation with a manufacturer of dairy products, a formula was developed for commercial-scale production of a naturally flavored apple sherbet from frozen apple juice concentrate and apple dice impregnated with the concentrate. Excellent public acceptance was found for the apple sherbet in a large-scale market test conducted by the manufacturer. This development is of great importance to the apple industry as it bears favorably on the possibilities of frozen apple juice concentrate as a profitable outlet for pale colored and small-sized fruits.
13. Advances in utilization of fruit wastes: A new continuous process for treating pear waste to facilitate the separation of juice, and a new type of continuous press (dejuicing rolls) for effecting the separation into juice and pomace, have been developed. These

advances have brought studies on the utilization of fruit cannery wastes close to a successful conclusion. Pilot-plant operations were continued in cooperation with the Cannery League of California, an organization representing most of the fruit canners in California. The process was operated on a semi-commercial basis during the 1951 season.

14. Chart tells amount of sugar and vinegar needed in sweet pickles: A chart, believed to be the first of its kind, which can be used by cucumber pickle manufacturers to determine the exact amount of sugar and vinegar needed to put up sweet pickles that will keep safely, has been worked out in cooperation with the North Carolina Agricultural Experiment Station. The chart is based on information obtained in a study of the tolerance of sugar and vinegar of a yeast organism found to be commonly associated with sweet pickle spoilage in the industry, and on tests in a commercial plant over a two-year period. This chart should find widespread use in the pickle industry for standardizing sweet pickle formulas, for reducing spoilage, and for saving sugar.
15. Chlorophyll from broccoli: Chlorophyll, the green coloring material in plants, is now in great demand by industry for use as a deodorant and in medicine. In connection with studies on the utilization of vegetable wastes a method was developed for the production of chlorophyll from broccoli leaf meal and during the past year commercial use of the process was undertaken by one company.
16. Sex hormones from tomato plants: Sex hormones have been produced in the laboratory from a new chemical (named tomatidine), isolated by Bureau scientists from tomato leaves, stems, and roots. Tomato plants promise to be an important, domestically available, inexpensive source of these medically necessary hormones.
17. Control of roasting conditions improves quality of peanut butter: Bureau investigations have shown that careful control of roasting conditions within rather narrow limits is necessary for the production of peanut butter of optimum flavor and good keeping quality. This information is of value to the peanut butter industry in selecting conditions of processing that will produce products of high consumer acceptance and long shelf life. The information is also of interest to the Quartermaster Corps in guiding the procurement of peanut foods of high quality for military personnel.
18. Research aids expansion of rice bran oil industry: The production of rice bran oil as a byproduct of the rice milling industry has grown rapidly in the United States during the past few years, largely as a result of the Bureau's research. This research has developed technical information on prevention of deterioration of the oil in the bran between milling and extraction, on methods of refining the extracted oil to improve the yield and quality of the product, on the properties of the oil for specific uses, and on the yields of oil to be expected from brans of different variety



and origin. Several plants operating at full capacity in 1950 put large quantities of rice bran oil on the market; but the total output was only a fraction of the 50 million pounds, with a potential value of \$10,000,000, that could have been produced from the year's rice crop. A new plant was under construction in 1951.

19. Improved crude pine gum filtration: An improved method for filtering crude pine gum has been developed and adapted to the Bureau's gum cleaning process. The new procedure permits use of less costly filter media and can handle a low-quality gum better than with the filtering method now generally used by the industry. The filter unit needs cleaning only once daily and can be cleaned without being taken apart. The new method of filtration has already been adopted by one plant.
20. Improved process for making citric acid: Citric acid, important for food and drink flavors, is now produced by fermentation of selected molasses in shallow pans. It has been demonstrated in the laboratory that addition of small amounts of methyl alcohol permits the use of the cheaper types of molasses. This new process can be used in the more efficient deep vat type of fermentation. All traces of methyl alcohol are, of course, removed in the course of production.
21. Permanent glass color standards for honey have been developed in in cooperation with the Production and Marketing Administration. The standards are now in commercial production; they replace more expensive and cumbersome color grading devices making it possible for small producers to determine the color grade of their product.
22. Palm oil replacement in hot dip tinning: Palm oil, all of which is imported, is widely used in metallurgical applications, including hot dip tinning of steel sheets. It has been found that suitably processed inedible animal fats can replace palm oil in hot dip tinning. Full scale mill tests to confirm these results have been carried out, but complete evaluation of the tinned sheet has as yet not been made.
23. Frozen precooked foods: Rancidity is a serious problem in frozen cooked poultry products. This is particularly true where sauces or gravies are involved. The rancidity may develop during the preparation process or during frozen storage of the product. Antioxidants have been demonstrated to be effective in reducing this rancidity development. Results thus far obtained indicate a practical means of improving the quality of such items as creamed turkey. Sauces and gravies are important constituents of many precooked frozen meat and vegetable dishes. It has been found that the objectionable separation that occurs when the sauces are frozen can be avoided by the use of waxy rice flour in place of ordinary flour.



24. Book, writing, and waxing papers made from straw blends:

Advancing prices of wood pulp and shortage of newsprint have stimulated interest in fine straw pulp. In cooperation with a West Coast paper company and the Forest Products Laboratory, a series of fine papers and newsprint were made containing 20 to 50 per cent pulp from Pacific Northwest or Illinois wheat straws. These papers made on the small Forest Products Laboratory machine had improved formation, strength, and surface characteristics. The paper company expects to do further work in its own plant with the hope of using straw as a blend to improve certain of its present wood pulps.

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
Research on strategic and critical agricultural materials, Agriculture:			
Research on domestic production of natural rubber .....	108,829	117,300	117,300
Investigations of domestic produc- tion of vegetable tannins .....	47,590	50,000	54,800
Investigations on vegetable and animal fats and oils .....	---	72,500	72,500
Total .....	156,419	239,800	244,600
Operating expenses, National Insti- tutes of Health, Public Health Service:			
Utilization of plant material and vegetable sources of cortisone investigations .....	114,014	---	---
Working funds, Agriculture, Agri- cultural Research Administration (Bureau of Agricultural and Indus- trial Chemistry), Advance from De- partment of Defense, Department of the Army:			
Determination of changes in the physical and chemical properties of starch-water systems at selected concentrations .....	7,972	10,300	---
Research on the flameproofing of cotton textiles, and the retarda- tion of flaming and afterglow of cotton .....	2,511	40,289	---
Study of dehydration of fruits and vegetables .....	12,930	37,070	---
Research on a universal laundry- dry cleaning detergent liquid .....	---	6,500	---
Total .....	23,413	94,159	---
TOTAL OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS .....	293,846	333,959	244,600

## PASSENGER MOTOR VEHICLES

The estimates propose the replacement of one passenger motor vehicle at the Naval Stores Station, Olustee, Florida, at an estimated net cost of \$1,000. This vehicle will have an approximate mileage of 90,000 miles when traded in. The vehicle which is in unreliable mechanical condition, is used to transport Station and Bureau officials, collaborators, and other official visitors in connection with the research work of the Bureau on short inspection trips, etc., over all types of roads and terrain, to nearby points and remote sections of Alabama, Florida and Georgia not served by common carrier.





BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

Purpose Statement

The Bureau of Plant Industry was established under provisions of the Agricultural Appropriation Act of 1902, approved March 2, 1901, and the Act of June 3, 1902 (5 U.S.C. 524). In February, 1943, the name was changed to the Bureau of Plant Industry, Soils, and Agricultural Engineering.

Research is organized in four major groups, as follows:

1. Field Crops: Research is concerned chiefly with the production and improvement of cereals, cotton, forage, rubber, sugar, tobacco, and other important food, feed, fiber, oil and specialty crops. Increased yield, improved quality, and resistance to diseases, insects, heat, drought, cold, or other hazards is sought by breeding, selecting, and testing varieties and by improving crop management practices. Methods of controlling weeds are also studied.
2. Horticultural Crops: Research is conducted on the production and improvement of fruit, vegetable, nut, and ornamental crops, and on methods of reducing losses from diseases and deterioration involved in handling, processing, transporting, and storing these crops. Methods are developed for avoiding or controlling diseases of trees and forest products. Foreign plant explorations and introductions provide new crops and valuable breeding material for the development of improved crops. Investigations are also conducted on reducing crop damage caused by nematodes and on the control of plant disease epidemics.
3. Soils: Soil investigations are directed toward (a) the determination of systems of soil management and irrigation that will increase soil fertility and give most efficient crop production; (b) the improvement of fertilizers and liming materials; and (c) the classification and mapping of soils with particular respect to their crop production capacities, crop adaptations and management practices. The relation of soils to plant, animal, and human nutrition are also studied.
4. Agricultural Engineering: Agricultural engineering investigations are concerned with (a) the improvement of farm machinery for planting, cultivating, fertilizing, spraying, dusting, and harvesting crops; (b) the development of improved equipment and facilities for processing and storing farm products; (c) the design of improved farm buildings and houses; and (d) the development and application of electrical equipment to farm use.

The Bureau also is responsible for the operation, maintenance, and development of the National Arboretum which was established by Congress in 1927 in the District of Columbia to provide a collection of living plants from this country and abroad valuable not only for breeding with native species to develop improved strains of trees, shrubs, and flowers for parks, boulevards, and other landscape uses, but also for study by students and scientists.

The research work consists primarily of field, laboratory, and greenhouse experiments conducted usually in cooperation with state agricultural experiment stations, industry and others. Because of the diverse crops and wide range of soil and climatic conditions, it is necessary to conduct the work at numerous field locations. Research results are made available to farmers and others through increase and distribution of improved varieties, and by dissemination of information through the Federal-State cooperative extension service, publications, the agricultural press, and correspondence.

Work Locations and Personnel: The headquarters of the Bureau are at the Plant Industry Station, Beltsville, Maryland. In the field, the work is conducted at approximately 195 locations in 45 States, the District of Columbia, Puerto Rico, Canal Zone, and Mexico. As of November 30, 1951, under all funds of the Bureau there were 2,115 full-time employees, including 120 in the Departmental Service, and 750 part-time employees. In addition there were 725 collaborators serving without compensation.

	Estimated, <u>1952</u>	Budget Estimate, <u>1953</u>
Appropriated funds	\$11,484,650	\$11,696,000



Salaries and Expenses

	Plant Soil, and Agricultural Engineering Research	National Arboretum	Total
Appropriation Act, 1952 .....	\$10,589,730	\$136,920	\$10,726,650
Anticipated pay adjustment supplemental .	745,920	12,080	758,000
Base for 1953 .....	11,335,650	149,000	11,484,650
Budget Estimate, 1953 .....	11,547,000	149,000	11,696,000
Increase .....	<u>+211,350</u>	<u>- -</u>	<u>+211,350</u>

SUMMARY OF INCREASES AND DECREASES, 1953

Plant, Soil, and Agricultural Engineering Research:

To improve forage production in the South .....	+33,000
To develop methods for controlling halogeton and other noxious weeds .	+40,000
For soil surveys and soil management, irrigation, and salinity in- vestigations in reclamation areas .....	+125,000
For fertilizer technology and evaluation investigations .....	+350,000
Decrease due to partial absorption of pay adjustment costs .....	-61,650
Elimination of non-recurring item provided in the 1952 Appropriation Act for construction of a citrus laboratory at Orlando, Florida ....	-275,000
Total .....	<u>+211,350</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	Pay ad- justment absorption	Other	1953 (estimated)
<u>Plant, soil, and agricultural engineering research:</u>					
a. Field crop investigations .....	3,329,688	3,565,000	-20,000	60,000	3,605,000
(1) Cereal production, breeding, disease and quality investi- gations .....	(868,334)	(983,860)	(-5,520)	- - -	(978,340)
(2) Cotton and other fiber plant production, breeding, disease, and quality in- vestigations .....	(606,972)	(625,690)	(-3,800)	- - -	(621,890)
(3) Forage crop production, breeding, disease and quality investigations .....	(769,751)	(809,760)	(-4,360)	(20,000)(1)	(825,400)
(4) Rubber production, breeding, and disease investigations ...	(38,471)	(33,900)	(-160)	- - -	(33,740)
(5) Sugar-plant production, breeding, disease and quality investigations .....	(506,787)	(535,330)	(-2,920)	- - -	(532,410)

Project	1951	1952 (estimated)	Increase or Decrease		1953 (estimated)
			Pay	Other	
			adjustment: absorption:		
(6) Tobacco pro- duction, breed- ing, disease and quality investi- gations .....	(244,946)	(260,020)	(-1,550)	- -	(258,470)
(7) Drug, oil, in- secticide, tan- nin, flavoring, and special pro- duct plant inves- tigations .....	(90,790)	(99,180)	(-440)	- -	(98,740)
(8) Hop production breeding, disease and quality in- vestigations .....	(27,566)	(29,830)	(-180)	- -	(29,650)
(9) Weed control in- vestigations .....	(176,071)	(187,430)	(-1,070)	(40,000)(2)	(226,360)
b. <u>Horticultural crop:</u> <u>investigations</u> .....	2,999,250	3,500,650	-18,650	-275,000	3,207,000
(1) Deciduous fruit investigations ...	(447,884)	(468,430)	(-2,580)	- -	(465,850)
(2) Citrus, avocado and other sub- tropical fruit investigations ...	(159,964)	(176,390)	(-980)	- -	(175,410)
(3) Nut investiga- tions .....	(275,444)	(293,350)	(-1,730)	- -	(291,620)
(4) Vegetable inves- tigations .....	(601,646)	(634,550)	(-3,580)	- -	(630,970)
(5) Potato inves- tigations .....	(190,537)	(185,680)	(-1,130)	- -	(184,550)
(6) Plants for land- scaping and orna- mental purposes and farm wind- breaks, Investi- gations of .....	(242,026)	(254,170)	(-1,610)	- -	(252,560)
(7) Methods of hand- ling, transporta- tion and storage, and market dis- eases of fruits and vegetables, Investigations of:	(429,872)	(451,960)	(-2,690)	- -	(449,270)

(Continued on next page)

Project	1951	1952 (estimated)	Increase or Decrease		1953 (estimated)
			By	Other	
			adjustment absorption		
(8) Plant introduction, testing and maintenance of basic stocks .....	(355,414)	(432,760)	(-2,360)	- -	(430,400)
(9) Investigations to reduce crop damage caused by nematodes .....	(120,851)	(129,480)	(-740)	- -	(128,740)
(10) Basic studies of plant growth and development .....	(73,700)	(74,600)	(-540)	- -	(74,060)
(11) Research on plant disease epidemics and the identification of disease organisms .....	(101,912)	(124,280)	(-710)	- -	(123,570)
(12) Construction of laboratory at Orlando, Florida for citrus and subtropical fruit research .....	- -	(275,000)	- -	(-275,000)(3)	- -
c. <u>Forest disease investigations</u> .....	434,512	499,000	-3,000	- -	496,000
(1) Diseases of forest and shade trees and forest products .....	(434,512)	(499,000)	(-3,000)	- -	(496,000)
d. <u>Soils, fertilizers, and irrigation investigations</u> .....	2,614,923	2,625,000	-14,000	+475,000	3,086,000
(1) Soil improvement, management and irrigation investigations .....	(1,123,632)	(1,180,080)	(-6,440)	(+75,000)(4) (+150,000)(5)	(1,398,640)
(2) Fertilizers and their improvement .....	(224,572)	(216,780)	(-1,250)	(+200,000)(5)	(415,530)
(3) Soil classification for crop production .....	(1,050,357)	(1,092,260)	(-5,550)	(+50,000)(4)	(1,136,710)
(4) Investigations of the relation of soils to plant, animal, and human nutrition .....	(131,662)	(135,880)	(-760)	- -	(135,120)
(5) Construction or acquisition of buildings, facilities, and equipment at new Southwest Irrigation Field Station, Brawley, Calif.	(84,700)	- -	- -	- -	- -

(Continued on next page)



Project	1951	1952 (estimated)	Increase or Decrease		1953 (estimated)
			Pay adjustment: absorption:	Other	
e. <u>Agricultural engineering investigations</u>	1,103,082	1,146,000	-6,000	+13,000	1,153,000
(1) Farm machinery ....	(365,281)	(379,160)	(-2,280)	(+13,000)(1)	(389,880)
(2) Farm structures and related investigations	(243,073)	(257,820)	(-1,320)	- -	(256,500)
(3) Mechanical processing of farm products	(269,511)	(280,800)	(-1,400)	- -	(279,400)
(4) Farm electrification investigations	(225,217)	(228,220)	(-1,000)	- -	(227,220)
Subtotal ...	10,481,455	11,335,650	-61,650(6)	+273,000	11,547,000
2. <u>National Arboretum:</u>					
a. Operation and maintenance ....	104,514	111,000	- -	- -	111,000
b. Development of physical facilities .....	43,948	38,000	- -	- -	38,000
Subtotal .....	148,462	149,000	- -	- -	149,000
Unobligated balance	54,083	- -	- -	- -	- -
Total pay adjustment costs .....	[- -]	[774,400]	[- -]	[+44,600]	[819,000]
Total available or estimate .	10,684,000	11,484,650	-61,650	+273,000	11,696,000
Transfer in 1952 estimates to "Salaries and expenses, Office of Information, Agriculture" ....	+650	- -			
Supplemental Appropriation Act, 1951, for liquidation of a contract authorization provided in the 1950 Agricultural Appropriation Act ....	+100,000	- -			
Reduction pursuant to Sec. 1214 ....	+224,300	- -			
Anticipated pay adjustment supplemental .....	- -	-758,000			
Total appropriation or estimate .....	11,008,950	10,726,650			

## INCREASES AND DECREASES

### Project 1. Plant, Soil, and Agricultural Engineering Research

(1) Increase of \$33,000 under Projects a(3) and e(1) to improve pasture and forage crops in the South in order to promote livestock production, provide year-long grazing, increase diversification, and build up the soils.

Note: This increase, presented at this point as a consolidated justification, is distributed by projects as follows:

Field crop investigations .....	\$20,000
Agricultural engineering investigations..	<u>13,000</u>
	<u>\$33,000</u>

Need for Increase: Greater acreages of grasses and legumes are needed in the South more than in any other area of the United States. In four states one-half of the total farm income is produced from three row crops, cotton, tobacco, and peanuts, that occupy only one-fifth of the farm land. Profitable use for the other four-fifths of the land is essential for improvement of the economic condition of the farmers.

The row-crop systems of farming in the South which have been followed for generations have sapped the soil of much of its limited supply of natural fertility and subjected it to serious damage from erosion. Millions of acres have been abandoned. This is a problem of long standing that has stubbornly persisted over the years. Recently, however, experimental studies have revealed that with proper crop rotations, soil management, and fertilization practices the depleted soils of the area can be built up and maintained at high levels of productivity. Enormous potentialities have developed for economical production of milk, beef and other livestock products. Livestock enterprises based on a sound forage program can profitably utilize much of the land that now produces little or no income. Climatic conditions permit almost year-long production of pasture which is the most economical feed for livestock.

Recent improvements with some forage crops have been of marked benefit to profitable livestock production in some areas and particularly during certain seasons of the year. For most of the South, however, wholly satisfactory pasture and forage crops are not available. Existing information on adaptation, growth responses, and management requirements of the available pasture and forage crops is not adequate to permit the development of pasture programs to provide grazing throughout the growing season. There is strong evidence that much progress can be made if the problems are attacked with a more intensive research program. Demands of the national emergency for high levels of production, sustained over a long period, and the need for increased livestock products make this intensified research program highly essential to our National welfare.



The problems on which research work needs to be intensified include:

1. The breeding of improved grass and legume crops.
2. The determination of the best species and combinations of species adapted to the diverse conditions found in the region and providing grazing through various seasons of the year.
3. Reduction of the cost of establishing pasture and forage crop stands.
4. Development of better equipment for seeding, fertilizing, and harvesting forage crops, including the improvement of seed harvesting equipment.

In addition to the above a well coordinated attack on the entire problem would require work as soon as possible on the following related problems:

5. Development of better fertilizer and soil management practices and of more effective methods of improving pastures under different management and grazing systems.
6. Development of better methods of handling, curing, and storing feed crops.

The breeding and selection of improved grass and legume crops is greatly needed to develop improved varieties for each major species which will have high productivity and nutritive value, persistence, resistance to diseases and insects, and tolerance to adverse climatic and soil conditions. Resistance is especially needed to such diseases as crown rot of crimson and Ladino clovers and Rhizoctonia of tall fescue which are wiping out complete stands of these species. Most grain and forage crops grown in the Southeast have been imported from areas of different climate. While some improvements have been made by nature, and others through scientific research, very few crop varieties have been built to fit the specific environmental conditions of the different localities of the South.

The best species and combinations of species should be determined for providing year-long grazing of nutritious and palatable herbage under the diverse soil and climatic conditions of the region. A large number of summer and winter growing grasses and legumes are now being used in different localities and areas of the South. There is now no adequate experimental data for making recommendations. With such data available, the best species combinations could be used for each condition with attendant increases in forage yield, reliability of production, and soil improvement.

Reduction of the cost of establishing pasture and forage crop stands and dependability in establishing stands is essential to encouraging the development of grassland farming. It is not unusual for well-to-do farmers in the Southeast to spend \$30 to \$40 per acre to establish a good forage crop stand. Such costs are practically prohibitive to the many small farmers of the area and militate against diversification and the establishment of a livestock enterprise where most needed. Present rates of seeding in the Southeast are as much as three to four times the rates of other areas. The cost of seed



alone may amount to around \$25 per acre, in addition to which there is the cost of fertilizer, seed-bed preparation, and seeding. Joint attack on the problem of forage, soils, and farm machinery specialists is needed to reduce these costs, and still obtain good stands. Improper seed bed preparation for the small seeded grasses and legumes is probably one of the principal reasons for the present high rates of seeding. Research is needed to develop improved methods and equipment for seed-bed preparation. It is believed that through research the cost of establishing stands can be reduced to a reasonable figure, and greater dependability of establishing stands can be assured.

The development of better equipment is needed for seeding and fertilizing pasture and forage crop stands and for harvesting and cleaning grass and legume seeds. It is believed that seeding rates can be materially reduced by better seed-bed preparation and the development of more precise seeding equipment. Improvement of fertilizer placement will assure better stands. Seed harvesting losses currently run as high as 30 to 50 per cent and the development of more efficient harvesting equipment is essential to increasing seed supplies and reducing seed costs. Separation of seed from chaff is one of the difficult problems. With lupine, as much as 30 per cent of the seed is so damaged as to adversely affect its germination. More accurate grading and cleaning of seeds is needed to reduce weed seed content.

The Feed Advisory Committees gave high priority to the need for improved grasses and legumes for livestock production in the South and the Seed Advisory Committee also gave highest priority to the development of superior legumes and grasses and improved harvesting machinery for small legume and grass seeds.

Plan of Work: The work would be done in cooperation with state experiment stations of the South with the Federal government taking the leadership in organizing and coordinating the research on this problem. Federal funds of approximately \$80,000, currently available for this work in the South, are inadequate to do the job which needs to be done. State experiment stations are now working on various phases on the problem. Federal participation under the proposed increase would serve to develop a well-rounded program. The results of the program would be made available to the farmers through the Extension Service, publications and the action programs of Soil Conservation Service, the Agricultural Conservation Program of PMA, and Farmers' Home Administration.

The forage crops research would include:

1. Breeding to develop improved varieties of crimson clover, Ladino white clover, tall fescue, and other species having resistance to the major destructive diseases;
2. Evaluation and testing of various species and their combinations for productivity, nutritive value, persistence, distribution of production, nutrient requirements, responses to grazing and mowing, etc.;

3. Studies of responses of species to variations in soil and air temperature, humidity, light intensity, photoperiod, defoliation, nutrition, and soil moisture; and
4. Studies of stand establishment, including seed bed preparation; rate, date and method of seeding; rates and methods of application of fertilizers, minor elements and soil amendments to different species and combinations; and management of the new seeding.

The agricultural engineering research would include:

1. Research on the development of improved precision seeding, fertilizer placement, and tillage equipment so as to produce satisfactory stands under the varying soil conditions of the area; and
2. Research on the development of improved seed harvesting and cleaning equipment. The effectiveness of the threshing, separating, and cleaning units in different combines would be studied for the various seed crops and changes would be made to overcome poor performance.

Facilities for these studies are already available at Clemson, South Carolina.

(2) Increase of \$40,000 under Project a(9) to develop methods for controlling halogeton and other noxious weeds.

Problem and Need: Halogeton is a fast spreading, poisonous weed that now imperils livestock on the rangelands of seven western states. It is a close relative of Russian thistle and has spread from Elko County, Nevada, where it was first noted about 15 years ago, to Idaho, Wyoming, Utah, Montana, and California. The weed brings sudden death to sheep and cattle feeding on it in late fall and winter when other forage is not available. Halogeton has moved first into the trails, roadside ditches, sheep corrals, and similar areas where there has been little competition from other plants, and has subsequently swept into burned and overgrazed range lands. It is now established on more than a half million acres and is spreading rapidly.

The importance of control of halogeton is evidenced by the Supplemental Appropriation Act, 1952, approved November 1, 1951, which provided \$2,300,000 to the Bureau of Land Management and the Bureau of Indian Affairs of the Department of Interior for control of halogeton on the public domain and Indian lands of western states under the jurisdiction of the Department of Interior. Legislation introduced in the 82nd Congress (H. R. 1933 and 2052 and S. 1041) would authorize eradication and control of poisonous weeds, especially halogeton, on range and pasture lands irrespective of ownership. It is highly desirable that research to develop the most economical, practical, and effective control methods be undertaken as early as possible to assure the greatest benefit from the expenditure of federal and other funds for control programs.

The development of more effective and economical methods for controlling weeds is one of the more urgent problems facing American agriculture. Seven of the Advisory Committees established under the Research



and Marketing Act recommended expanding the research on weed control. The Bureau of Reclamation is anxious that research on the control of weeds along irrigation ditches and on irrigated lands be intensified to serve better the newly developed irrigation districts. Recent advances in the development of new herbicides, and airplane and ground equipment for applying such chemicals give promise of great benefits to be derived from additional research on the development of improved weed control methods. Such benefits would be measured in lower costs of control and increased crop and livestock production.

Plan of Work: The research program would include both ecological studies, and the development of weed control measures. Ecological studies would include obtaining information on seed formation, seed movement, seed viability and longevity in soils, and the spread of halogeton and other noxious weeds. Studies would also be conducted on root systems, growth requirements, and other factors useful in determining the best type of chemical or cultural practice effective in a control operation. Studies would include a thorough screening of herbicides to evaluate their effectiveness. The effect of season of year, age of plant, condition of growth, environment, and method of application would be investigated to determine the most efficient methods of using herbicides in a control program. Other control measures, such as burning, blading, or biological control would also be studied.

The research on halogeton would be conducted in the West, principally in Utah and Idaho. The work would be done in close cooperation with the State agricultural experiment stations and with the Forest Service and other federal agencies concerned with the problems. As improved control measures are developed, they would be passed on to the agencies concerned with conducting the control operations, and to the farmers and landowners through the Extension Service, publications, and the agricultural press.

(3) Decrease of \$275,000 under Project b(12) due to the elimination of a non-recurring item provided in the 1952 Appropriation Act for the construction of a laboratory at Orlando, Florida. General Services Administration is drawing the plans for the building and it is expected that invitations to bid on the contract can be issued by February, 1952.

(4) Increase of \$125,000 under Projects d(1) and d(3) to provide more adequately for soil surveys, and research in soil management, irrigation agriculture, and salinity investigations in reclamation areas.

Need for Increase: The Bureau of Reclamation, in the planning and development of their reclamation projects, looks to the Department of Agriculture for agricultural research and technical guidance. Such guidance is extremely valuable in assuring the wise expenditure of the large sums of federal funds required for the development of these reclamation projects, and for enabling the irrigation settlers to establish profitable farming operations which will repay construction costs. The state agricultural experiment stations in reclamation areas have requested cooperation in conducting agricultural research programs for the benefit of farmers on reclamation projects. Included in the agricultural research needed for reclamation areas are



soil surveys, soil management and crop production studies, and salinity investigations. The Bureau of Plant Industry, Soils, and Agricultural Engineering would conduct these studies and investigations in close cooperation with the irrigation engineering studies and technical assistance programs of the Soil Conservation Service and the economic investigations of the Bureau of Agricultural Economics.

Soil surveys. Soil surveys of proposed reclamation projects are needed to aid in the determination of areas where successful irrigation agriculture is likely. It is important that these surveys be completed before final decisions are made on the location and development of new irrigation projects. Soil surveys also provide a basis for selection of sites at which to make soil management, crop production and salinity investigations and for the subsequent extension of the results to similar soils. Through the use of soil surveys, much of the costly trial and error period which has been so common in the development of newly irrigated areas can be avoided.

Soil Management and Crop Production Investigations under Irrigation Agriculture. Not only the Bureau of Reclamation and the agricultural experiment stations, but also farmers and public agencies of the states in which irrigation projects are located are very desirous of federal assistance in the conduct of soil management investigations on the development farms which are being set aside on reclamation projects for research and for demonstrations. The Bureau of Plant Industry, Soils, and Agricultural Engineering plans to assist in research programs on the Riverton Project in Wyoming and the Central Snake River projects in Idaho. The soils of the Riverton Project vary from sandy loam to heavy clay loam. Salinity is a serious problem on these soils and already approximately 15,000 acres of the project have either gone out of production or are likely to do so unless some remedial measures are developed to prevent the rising water table. Research is needed on the project to determine satisfactory methods of soil management, cropping, and cultural practices under irrigation.

The Central Snake River projects embrace the potential development of some 1,035,000 acres of new land plus supplemental water for 485,000 acres now irrigated with an inadequate water supply. It has been estimated that there are 225,000 acres of "slick spots" which are difficult to irrigate because of slow intake of water, slow drainage, and poor soil structure. Soil management and soil physical investigations are needed to permit economical use of these lands.

Salinity Investigations. On much of the land now irrigated in the West, crop yields have been reduced from 10 to 20 per cent due to salinity, an excess of soluble salts in the soil. More than 500,000 acres of irrigated land have been abandoned because of salinity problems. A part of the increase is requested to permit the expansion of the Bureau's salinity investigations to the most critical of these areas.

Plan of Work: The proposed increase would be distributed by fields of research as follows:

Soil surveys .....	\$ 50,000
Soil management, crop production, and salinity investigations under irri- gation agriculture .....	<u>75,000</u>
	<u>\$125,000</u>

The increase for soil surveys would provide for two additional field parties and for the related laboratory and cartographic work. The two parties would map from 50,000 to 100,000 acres per annum depending upon the complexity of soil conditions in the areas selected for survey. These areas, selected in cooperation with the Bureau of Reclamation and the state agricultural experiment stations, would be primarily those being considered for irrigation.

Soil management and crop production research would be conducted primarily on development farms which would be provided by the Bureau of Reclamation on the Riverton and the Central Snake River projects. The Bureau of Reclamation would provide not only the land, but also the necessary irrigation facilities, farm buildings, and farm equipment. The research would be concerned with the determination of the most efficient combinations of fertilizer--soil moisture--and cultural practices for crop production. On the Central Snake River Project, field and laboratory studies would be conducted on methods for improving the water intake of the "slick spots" soils, the soil amendments required to reclaim such soils, and cultural practices needed for successful crop production on the high silt soils characteristic of the area.

The increase would also permit the formation of a small unit with specialized mobile equipment, for the study of salinity and reclamation problems on many areas in the 17 western states. This unit would be headquartered at the U. S. Salinity Laboratory, Riverside, California. The unit would conduct limited investigations to diagnose the problems in an area, suggest remedial measures, and serve in a consulting capacity to the irrigation district or other agency concerned. The services of the unit would be available to public agencies generally. It would utilize all the techniques developed from the fundamental research of the Salinity Laboratory. The problems of critical areas would be selected for more intensive research by this Bureau and the Soil Conservation Service.

(5) Increase of \$350,000 under Projects d(1) and d(2) for fertilizer technology and evaluation investigations.

Objective: To develop new and improved fertilizers to meet the expanding needs of American agriculture and to enable efficient utilization of the increasingly larger quantities of high-analysis materials being produced in the program of uranium recovery from phosphate rock.



The Problem: Use of plant nutrients in commercial fertilizers exceeds 4 million tons annually, more than double the amount 10 years ago. But the supply is still short of the demand, and requirements are expected to increase steadily. The program for recovery of uranium from phosphate rock will provide increasingly large quantities of fertilizer-grade phosphoric acid and its derivatives. Efficient and economical utilization of large volumes of such high-analysis products involves numerous problems of ammoniation, formulation, physical conditioning, and processing to produce new types of concentrated fertilizers. Major technical phases of the over-all problem are the development of processes whereby (1) phosphoric acid can be made into concentrated superphosphates in plants and equipment now used for the manufacture of the ordinary, low-analysis types of superphosphates, and (2) phosphoric acid and other concentrated phosphates, together with nitrogen, potash, and other plant nutrients, can be manufactured into granular, high-analysis mixed fertilizers in one operation. The development of these new processes requires the use of pilot-plant facilities. The Tennessee Valley Authority has such facilities which can be made available for cooperative studies.

The efficiency of a fertilizer material generally depends greatly on the type of soil and the method of distribution and placement of the fertilizer in the field, as well as on the crop, climatic conditions, and farming system. The fertility status of the soil has often been greatly increased or decreased by past management, making substantial changes in fertilizer practice essential for efficient production. For these reasons development of new fertilizers must be accompanied by thorough evaluation studies. Such studies require laboratory and greenhouse investigations and, especially, intensive field experimentation with a wide range of soils and crops. Modern advances in soil-management research have shown the critical importance of optimum combinations of soil, fertilizer, and cultural practices. It is only through field experiments embracing these combinations and extending the preliminary findings of laboratory and greenhouse investigations that a true evaluation of new fertilizer developments can be obtained.

Significance: The United States consumes annually about 2 million tons of phosphorus (available  $P_2O_5$ ) as commercial fertilizers, of which some 80 per cent is in the form of low-analysis superphosphate (containing only 18 to 20 per cent of  $P_2O_5$ ) manufactured by 81 companies in 202 plants. High-analysis triple superphosphate (45 per cent  $P_2O_5$ ) manufactured in nine plants, supplied 310,000 tons of  $P_2O_5$  in 1950. It is estimated that by 1960 the annual requirement of  $P_2O_5$  by American agriculture will be 3.6 million tons. The urgency of the program for recovery of uranium from phosphate rock assures that a large part of this requirement will be derived from such primary products as phosphoric acid, triple superphosphate, and other highly concentrated forms of  $P_2O_5$ . Steps have already been taken to approximately double the production of these forms of  $P_2O_5$  and further large expansion of the production is planned. This means that many plants producing low analysis superphosphate will be forced to close, with large financial loss to their owners, unless the plants can be utilized for the processing of high-analysis phosphate materials into



finished fertilizer products. There is evidence that by the development of new methods the facilities of such plants could be used directly for the manufacture of high-analysis superphosphates containing 30 per cent or more of  $P_2O_5$ . This would reduce the need for new facilities to convert phosphoric acid into fertilizers.

In 1949-50, 70 per cent of all plant nutrients were used as mixed fertilizers. They averaged 23.2 per cent of total plant nutrients, Nitrogen (N), Phosphorus ( $P_2O_5$ ), and Potassium ( $K_2O$ ). One of the most effective ways of decreasing the cost of plant nutrients to the farmer is by increasing the concentration of mixed fertilizers, thereby reducing transportation, handling, and bagging costs per unit of nutrients. It is estimated that a saving of at least \$20 per ton of nutrients can be effected by increasing the concentration of a mixed fertilizer from 23 per cent to 30 per cent. Higher concentrations permit additional savings. With the greatly increased supplies of liquid phosphoric acid and its derivatives that will be available from the uranium recovery program, it will be possible ultimately to increase the average plant-nutrient concentration of mixed fertilizers to 30 per cent or more. It appears that this objective can be accomplished most economically by processing phosphoric acid or its derivatives with anhydrous ammonia, potash salts, and other materials in a continuous operation to produce a wide variety of granular, high-analysis complete fertilizers. As an alternative procedure, such fertilizers might be made with phosphate rock, phosphoric acid, nitric acid, anhydrous ammonia, and other materials.

Full development of the potentialities of these processes and their products will require not only much technological research and development work on both laboratory and pilot-plant scales but also extensive agronomic investigations to determine the sphere of usefulness of the fertilizers under a wide variety of soil, crop, and farming conditions. The products should be suitable for direct application to the soil or for use in the preparing of most types of high-analysis mixed fertilizers, and they should be generally competitive with other phosphate fertilizers in most parts of the country.

Plan of Work: Laboratory and pilot-plant investigations will be made of the preparation of high-analysis superphosphates by treating phosphate rock with mixtures of phosphoric and sulfuric acids, to determine the effects of acid concentrations and ratios, proportions of acid to rock, reaction temperatures, time of mixing, behavior of different types and grades of phosphate rock, and the storage and handling characteristics of the products under different conditions. Adaptation of the process to the equipment available in low analysis superphosphate plants will be a major objective. Laboratory and pilot-plant investigations will also be made of the preparation in a continuous operation of high-analysis complete fertilizers from phosphoric acid and its derivatives, ammonia (anhydrous and solution forms), potash salts, and other materials. The investigations will include studies of the reactions of ammonia with the various calcium phosphates, factors influencing the formation of granules of the desired size and other physical characteristics, treatment of the granular products to prevent caking during storage, improvement of containers to prevent moisture absorption, and development of equipment for carrying out the processes.

Fertilizers will be produced with ratios of nitrogen, phosphorus and potassium and with contents of secondary and minor elements to meet specific crop and soil requirements that have been determined by other investigations. It is through coordination of fertilizer technology and evaluation with soil management and crop production research that most progress will be achieved. Production of a wide range of mixed fertilizer materials will be on a scale adequate for extensive field experiments and to provide material for demonstrations with farmers by educational and service agencies.

The technological investigations and pilot-plant production will be conducted in cooperation with the Atomic Energy Commission, the Tennessee Valley Authority, and the fertilizer industry. Full utilization will be made of the laboratory facilities at Beltsville. It is contemplated that the pilot-plant investigations, and such additional laboratory researches as may be needed will be carried out by arrangement for using facilities of the Tennessee Valley Authority.

Work on evaluation of the new fertilizers will be conducted in cooperation with the state agricultural experiment stations as a broad but closely coordinated investigation, involving laboratory, greenhouse, and field experiments. Use will be made of radioactive tracer techniques. Laboratory and greenhouse studies will be made at Beltsville to evaluate the plant-nutrient qualities of the fertilizers in relation to their chemical and physical composition and characteristics and their reactions with soils. The field investigations, which will be planned to supplement and extend the laboratory and greenhouse studies, will be of two general types:

- (a) The most intensive field experiments will be conducted at only a few locations, representing the different agricultural regions of the country. Such experiments will involve fertilizer evaluation on important types of agricultural soils and with major crops and cultural variables. From these carefully controlled field, greenhouse, and laboratory studies will come the basic evaluation and understanding of the new fertilizers and their properties.
- (b) An extensive program of more simple field trials will also be conducted at additional locations to test the applicability of these findings over as wide range as possible of major soil, crop, and climatic conditions. Usually these field trials will be conducted by the State experiment stations under cooperative agreements wherever adequate arrangements can be made for this type of study.

(6) A decrease of \$61,650 due to partial absorption of pay adjustment costs. The distribution of this reduction by projects is shown in the preceding Project Statement.



### CHANGES IN LANGUAGE

The estimates include proposed changes in the language as follows (new language underscored; deleted matter enclosed in brackets):

Plant, soil, and agricultural engineering research: For expenses necessary for investigations, experiments, and demonstrations concerning plants, soils, and agricultural engineering, including those related to \* \* \* farm machinery and processing equipment;

- 1 farm buildings, and farm electrification; and for the acquisition (not to exceed one), operation, and maintenance of airplanes;
- 2 [\$10,589,730, including not to exceed \$275,000 for the construction of a laboratory at Orlando, Florida] \$11,547,000.

The first change in language would authorize the acquisition of one airplane. The Civil Aeronautics Administration, in cooperation with the Texas A & M College, the Flying Farmers organization, the Bureau of Plant Industry, Soils, and Agricultural Engineering, and others has developed a plane especially for agricultural purposes. This plane was first tested in operation during 1951 and it is expected that it will be available for transfer to the Department without cost for use in developing improved spraying, dusting, seeding, and fertilizer distributing equipment for airplanes.

The use of airplanes for such agricultural purposes is increasing rapidly. The present dispensing equipment, however, has been adapted from equipment used with ground machines. Research is needed to develop dispensing equipment especially adapted for airplane use so as to provide for more efficient and effective applications and to reduce the hazards now encountered. The Bureau now has no airplane for such experimental work, and the authority is needed to enable the Department to accept the airplane, or, if the transfer is not effected to purchase one for the same purposes. Hangars and facilities for servicing an experimental plane are available from cooperating agencies of the Department now using airplanes for control purposes.

The second change in language is for the purpose of deleting the non-recurring provision inserted in the 1952 Agricultural Appropriation Act for the construction of a laboratory at Orlando, Florida, since construction of the building will be completed with 1952 funds.





## STATUS OF PROGRAM

### Plant, Soil, and Agricultural Engineering Research

#### FIELD CROP INVESTIGATIONS

Research is conducted on the production and improvement of the principal farm crops including cereal, cotton, forage, sugar, tobacco, and other important crops. They provide the major sources of food and feed for livestock and important fibers and oils for industry. They include important soil-improving and soil-conserving crops. For the 1951 crop or marketing year, the total farm value of all crops amounted to approximately 17.2 billion dollars. Research is also conducted on the development of the most economical and effective methods for controlling weeds.

Many new diseases and races of disease organisms are continuously appearing and threatening crop production. For example, new races of stem rust, bunt, and a mosaic disease are now threatening wheat production, black shank is spreading rapidly in tobacco growing areas, and verticillium wilt is serious in certain cotton producing areas. Each crop has its particular problems. Farmers are also still faced with threats to production by diseases and pests which have been known for some time, such as leaf rusts of wheat, black root of sugar beets, corn borers, and others. While considerable progress has been made toward the development of good commercial varieties resistant to these established diseases and pests, much work remains to be done in this field.

Generally, such research involves long-term projects. Breeding, selection, and testing work ordinarily requires many generations to develop new varieties which are resistant to not one, but several diseases which may be prevalent, and which also have the quality, productivity, size, and other important agronomic characteristics essential to commercial production. Valuable sources of germ plasm to meet the needs for crop improvement have been or are being collected through foreign plant introductions and the selection of domestic varieties. A strong research program is required to utilize these sources of material so as to bring about the increased yields and greater dependability of crop production which are so essential to meeting the demands of an expanding population.

#### Selected Examples of Recent Progress:

1. Six new corn hybrids with resistance to corn borers have been developed in cooperation with the Iowa Agricultural Experiment Station and released for commercial production in the western corn belt. Two new higher yielding improved corn hybrids for the South were also released.
2. Research to develop wheat varieties resistant to Stem Rust 15B has been pushed. This new threat to wheat production caused an estimated loss of more than 25 million dollars to the 1950 crop. The loss from the disease in 1951 was small, but this was due to the unusual drought and cold conditions in Texas and northern Mexico during the winter of 1950-51 which prevented the build-up of the rust inoculum and its spread northward during the 1951 growing season. No commercially grown varieties in the United States or Canada are resistant to this race. A

total of about 5,000 lines, including some 1,000 foreign wheats from the World Collection, have now been tested in greenhouses at Beltsville. In the fall of 1950, 591 lines which appeared to have resistance to 15B were increased at Brawley, California, and provided seed which was distributed to cooperators in the spring of 1951 for comprehensive region-wide tests throughout the spring wheat area. Selections from these field tests and from further greenhouse tests have provided approximately 1,200 lines which are being increased at Brawley in the fall of 1951 to produce wheat which can be distributed in the spring of 1952 for further testing in the spring wheat area.

Five thousand varieties from the world wheat collection were tested in Mexico in the summer of 1951 under severe rust conditions and approximately 150 were found to have desirable resistance. Five hundred lines selected from the breeding program in the winter wheat region were also sent to Mexico in the fall of 1951 for testing. Some of the resistant lines have also been sent to South American countries for testing for resistance to 15B and other races of rust prevailing at those locations. A few varieties, including certain ones from Kenya and Egypt, and strains developed from these varieties have been found to be resistant at all locations. These resistant strains must now be tested for resistance to other diseases, for other desired plant characteristics, and for yield and quality. As the result of cooperative work with the Mexican Ministry of Agriculture and the Rockefeller Foundation, a new improved variety resistant to 15B was developed and seed increased sufficient for planting about 40,000 acres in Mexico in the fall of 1951. The use of this variety in Mexico and possibly in southern Texas, will reduce the amount of rust inoculum which would otherwise be blown northward in the Spring.

3. Southland oat proves popular in Gulf Coast Region. This new oat variety developed cooperatively with the Florida and other state experiment stations is especially adapted for the Gulf Coast region and for fall seeding. In Florida it has outyielded other varieties by 12 to 24 bushels per acre. By increasing Southland under irrigation in Idaho and other western states in 1950, approximately 40,000 bushels of seed were available for sowing in Florida in the fall of 1950. This produced sufficient seed to meet commercial planting requirements for the fall of 1951 for the entire Gulf Coast area.
4. Sorghum breeding has stimulated new industries. The breeding of combine-type varieties made grain sorghum a profitable cash crop that could be harvested with little labor. This stimulated production and provided an abundant supply of grain for processing. Sorghum breeders and chemists of the Department and the state agricultural experiment stations, cooperating with manufacturers and industrial chemists, are developing new sorghum products. Three new sorghum industries have been established since 1947. About 6 million bushels of grain sorghum are used annually in the manufacture of dextrose sugar, starch, edible oil, and by-product feeds. Smaller quantities are being ground into a flour used as an adhesive in the manufacture of gypsum board. The development of sorgos of high sugar content made feasible the dehydrated sorghum pellet industry whereby high-sugar sweet sorghums



are dehydrated, ground, mixed with other feedstuffs, and made into pellets for feeding livestock. The breeding of a pop sorghum created a new product, and food industries are experimenting with new confections and foods made from the popped grains.

5. Ammonium sulfate determined to be superior to ammonium nitrate on rice in California. Six-year experiments in cooperation with the California Agricultural Experiment Station demonstrated an average increase over unfertilized control plots of 18 per cent per acre for ammonium sulphate as compared with 10 per cent for ammonium nitrate.
6. Cotton defoliants are being used in increasing quantities but continued studies show that caution should be observed as to applying them too early. By early applications, yields may be reduced, the immature bolls will contain thin-walled fibers that will contribute to yarn neppiness, the seed will be low in oil, and the germination reduced. In general, 30-day old bolls will not be harmed.
7. Winter cotton planting in Mexico speeds cotton breeding program. In cooperation with the National Cotton Council a successful winter crop of cotton was grown at Iguala, Mexico. Cotton breeders from all parts of the belt sent over 600 selections of breeding material for the winter crop. Self-pollinated seed was returned to each breeder in time for spring planting. Plans are made to continue this program which will enable breeders to grow two generations a year.
8. Higher soybean yields in the South are attained by delayed planting and wider row spacing. Soybeans planted after May 1 have given more economical production than those planted earlier. While studies in the North showed that maximum yields resulted from 21-inch rows, in the South no increases in yield resulted in planting rows closer than 36 to 42 inches. Varieties adapted to the South have a much bushier habit of growth.
9. A new variety of broadleaf birdsfoot trefoil, Granger, developed in cooperation with the Oregon Agricultural Experiment Station, is being released for seed production in the Northwest. It is the best of a large number of imported strains tested during the past 12 to 15 years. It establishes rapidly, is a heavy producer of forage and seed, long-lived, apparently quite free of disease and insect injury, and makes a rapid recovery after cutting. It is very palatable and a good companion legume for various grasses.
10. Grass seed production increased by improved management practices. Availability of adapted legume and grass seeds is essential to a grassland agriculture. At Corvallis, Oregon, it was found that growing Alta-fescue in 3-foot rows gave 234 per cent increase in seed yield over solid-seeding as a 7-year average, while with red fescue the increase was 210 per cent more for 3-foot plantings. Row culture also usually results in higher quality seed. At Bozeman, Montana, seed yields of several grasses have been increased 200 to 300 per cent by adequate applications of nitrogen early in the growing season. Fall applications did not increase seed yields. In areas of scant rainfall, nitrogen solutions have been sprayed on the leaves as a means of getting it into the plants at the proper time and good results obtained even though some leaves were severely injured.

11. Tall fescue-Ladino clover pastures have high beef-producing qualities in tests cooperative with the Missouri Agricultural Experiment Station. Steers gained 516 pounds per acre annually on such combination, compared with 315 pounds on bluegrass-Ladino clover, and 239 on bluegrass-sweet clover. These pasture mixtures were fertilized with phosphate and potash, but no nitrogen. On bluegrass alone, the application of 200 pounds of ammonium nitrate per acre as well as phosphate and potash was required for steers to produce gains of 419 pounds per acre. This shows that legumes in pasture mixtures supply the nitrogen required. Although bloat on Ladino clover has been a problem of much concern, no difficulty was encountered on those pastures which contained plenty of grass.
12. A new sugar beet variety introduced in 1949 because of its resistance to blackroot in the humid area gave increased yields in 1950. In tests in Michigan and Ohio where black root was a factor, the new variety produced an average of 14.0 tons per acre, compared with 10.5 tons for the commonly grown U. S. leaf-spot resistant variety.
13. Sugar beet seed production aided by chemical weed control. Production of sugar beet seed in Oregon has posed serious weed problems. The crop is planted in the fall, over-winters in the field, and the seed is harvested the succeeding summer. The fall rains usually make the fields so wet that weed control by cultivation is not possible. Experiments cooperative with the Oregon Agricultural Experiment Station have demonstrated that ryegrass and chickweed can be controlled successfully with IPC (Isopropyl-N-Phenyl-Carbamate) sprays.
14. New sugarcane variety, CP 43/47, adapted to mechanical harvesting, introduced in Florida. This variety combines relatively high productiveness and satisfactory disease resistance with erectness of growth and uniformity of stalk length. These latter qualities are particularly necessary to overcome the losses of machine harvesting due to excessively high cane stumps and unrecovered field scraps. This variety represents the first important advance in development of varieties for mechanical harvesting in Florida.
15. Research program initiated to develop burley tobacco varieties resistant to black shank. During recent years this disease has spread spectacularly. More than 30,000 farms have become infected in Virginia, Tennessee, Kentucky, North Carolina, South Carolina, Maryland and Pennsylvania. The only adequate known control measure is disease resistance. Black shank immunity is present in certain wild species of Nicotiana and it is necessary to transfer this immunity to the cultivated tobacco and then conduct field tests with the new hybrids. Successful crosses have been made and the hybrid plants have repeatedly resisted infection when inoculated with black shank fungus. Work with the first back cross populations is already in progress to incorporate this resistance into varieties commercially acceptable. An extensive breeding program will be required before multiple disease-resistant commercial varieties are available.
16. Leaf decay during curing of burley tobacco found to be caused by high fertilization and the use of excessive amounts of chlorine. Tobacco



from heavily fertilized fields showed marked tendency for the mid-rib and veins to remain moist and this favored fungal attack. Chemical analysis showed that the mid-ribs of this tobacco contained 2 to 3 times the chlorine to be expected.

17. Control developed for anthracnose of Digitalis, a drug plant grown in eastern Pennsylvania. Treatment of the seed before planting by hot water at 55°C. for 15 minutes gave disease-free plants. Field tests showed that plants from disease-free seed remained free of disease, whereas plantings from infested seed were severely affected.
18. Control of sand sagebrush increases grass density and beef production. Eight years after sand sagebrush control treatment of pastures at the Southern Great Plains Field Station, Woodward, Oklahoma, grass density is 266 per cent greater than before treatment, whereas sagebrush density is 67 per cent less. During the same period on untreated pastures, grass density increased 108 per cent as the result of favorable weather and proper grazing, and the sagebrush density increased 107 per cent. Average beef gain per acre from the cleared pastures has been 52 per cent greater for the 8-year period.

#### HORTICULTURAL CROP INVESTIGATIONS

Research is conducted on (1) production and improvement of fruit, vegetable, nut, and ornamental crops, (2) development of economical methods of handling, processing, transporting, and storing fruits and vegetables so as to maintain quality and control diseases, (3) introduction and testing of new plant materials, (4) control of nematodes causing crop damage, and (5) plant disease epidemics and the development of information and methods to aid in their control. The horticultural crops include the great health protectors in our diet and are highly important staple food sources. For the 1951 crop or marketing year, they had a total farm value of approximately 2.9 billion dollars.

#### Selected Examples of Recent Progress:

1. Several of the 64 new fruit varieties originated by the breeding program in the 1940's are now important in commercial production. Forty per cent of the new acreage planted to canning peaches in recent years in California consists of the nine new canning clingstone peaches bred and selected, in cooperation with Leland Stanford University and the California Agricultural Experiment Station, to extend the season of this type of peach for the canning industry. The three freestone varieties introduced for the Southeast (Dixigem, Dixired, and Southland) have already become important early shipping peaches, mainly because of their firm flesh and high color. The Cardinal grape, a large-fruited, very early red table variety, has been planted on several thousand acres in Arizona and California. The red raspberry, Williamette, introduced cooperatively with the Oregon Agricultural Experiment Station, is already an important variety in Oregon because the fruit is very large, firm, and excellent for canning and shipping. On the Eastern Shore of Maryland, the leading strawberry variety is Temple, introduced in cooperation with the Maryland Agricultural Experiment Station because of



its resistance to the red stele disease. Another variety, Fairland, is widely raised in the North. The Massey strawberry, introduced in cooperation with the North Carolina Agricultural Experiment Station, because it produces a large, high-flavored, attractive shipping berry, is the chief variety grown in eastern North Carolina.

2. Mulching apple trees with high-nitrogen hay found to be an effective way of applying the nitrogen and other nutrients needed for tree growth and yield. When 200 pounds of high-nitrogen hay was applied to 18-year-old apple trees of very low vigor and no supplementary fertilizer of any kind was added, some improvement in growth and in foliage color was evident the first year, but by the third year the trees were outstandingly vigorous and productive as compared with trees mulched with straw and receiving supplementary nitrogen. The high-nitrogen hay was produced by applying ammonium nitrate at the rate of 300 pounds per acre.
3. Brown rot of peaches controlled by sulfur sprays, two or three at blossoming time, and two to four later on to the fruit. A large part of the inoculum that causes rot in peaches starts in the blossoms and the spores spread from the flower clusters and stems to the developing fruit. Commercial adoption of the spray program developed by the Department has resulted in notable reduction of brown rot losses, even through the marketing period.
4. Handbook of virus diseases of stone fruits published. It brings together for the first time in illustrated articles the scattered information on 48 virus diseases, 7 viruslike diseases, 10 deficiency diseases, and 3 chemical-excess troubles that might be confused with virus diseases. It will be helpful not only to regulatory officials, nurserymen, and growers in recognizing and controlling these diseases, but also to research workers and students.
5. Congo, the high quality anthracnose-resistant watermelon with exceptional resistance to breakage in handling, released two years ago by the Vegetable Breeding Laboratory, Charleston, South Carolina, proved so promising in its first year of commercial production that about 40,000 acres in the Southeast were planted with this variety in 1951.
6. Fertilizer studies with citrus help conserve scarce superphosphate. Results obtained from two nine-year field fertilizer experiments indicate that citrus trees on the light sandy soils of Florida make no beneficial use of the very heavy applications of superphosphate which has been common orchard practice. In the 2½ years since a progress report on these findings was published, growers have spent about half as much money on phosphate fertilizers and have used more nitrogen, which tends to increase yields. An estimated 100,000 tons of superphosphate per year was used in citrus culture in Florida 3 years ago. Reduced use in citrus culture has released a part of this short material for other crops.
7. Tristeza or similar virus disease found in Louisiana citrus. In 1950, a disease which has all the characteristics of tristeza was found in citrus orchards below New Orleans, Louisiana. The outbreak was confined to a few orchards at the southernmost end of this citrus area.

A few trees showing similar symptoms died there in 1948, approximately 50 trees were affected in 1949, and in 1950 several hundred trees were removed because of the disease. Trees on trifoliata rootstocks were not affected, even when adjacent to affected trees on sour orange rootstock. Work is now under way in the affected groves to locate strains of the virus, to determine the insect vector or vectors, and to test the tolerance of various rootstocks to the virus which may possibly differ in its rootstock relationships from the tristeza strain in South America.

8. New late blight resistant potato varieties save copper. Late blight is the most destructive disease of potatoes in cool, humid climates. It is estimated that 50 million pounds of copper sulphate are used annually in the U. S. to control late blight. Most of this could be saved by using blight-resistant varieties, thereby saving large quantities of critical copper and avoiding losses from blight despite the application of such sprays. Three varieties of potatoes, Kennebec, Pungo, and Cherokee, all highly resistant to late blight have been released recently.
9. Irrigating before killing potato vines reduces stem-end discoloration. Some method of killing potato vines prior to harvest, by chemicals, flaming, or mechanical beaters, is now used in practically all commercial districts, but each of these methods has caused considerable stem-end discoloration of the tubers. Experiments in cooperation with the Colorado Agricultural Experiment Station showed that maturity of vines was less important than moisture, that there was more discoloration when killing was done with the soil at low soil moisture levels, and that the discoloration can be minimized, regardless of vine-killing method, by irrigating the fields four days before applying treatments.
10. Improved composting methods developed for mushroom culture. Dwindling supplies and high costs of manure are a serious problem in mushroom production. A new method of composting has been developed that saves time and labor as well as manure. By using this new method a ton of manure will produce compost to fill a substantially larger area in the mushroom house and produce a substantially larger yield of mushrooms. Improved temperature treatments, or "pasteurization" practices, based on recent studies of the thermal death points of the specific organisms that inhabit the manure pile have been developed for the compost which conserve the solids, more effectively suppress undesirable fungi, bacteria, and insects, and increase the yields and quality of mushrooms produced.
11. Methods of drying peanuts improved. Too rapid artificial drying of peanuts has resulted in loss of flavor and made the peanuts brittle, causing them to be damaged during shelling and cleaning. Research has shown that approximately 2 days should be used in the artificial dryer to bring the moisture in the pods to a level not lower than 12 per cent and that further removal of moisture should occur slowly as under warehouse conditions.



12. Gladiolus thrives on limited amounts of fertilizer. Three year fertilizer tests completed in 1950 showed that the average length of flower spike and the number of florets per spike were greatest in the unfertilized plots and that fertilizer applications did not cause significant differences in the number of flower spikes produced. Gladiolus growers can greatly reduce the amount of fertilizer being used, especially on soils of known good fertility.
13. Powdery mildew of roses, the most serious disease affecting this crop in greenhouses, can be controlled by a new fungicide. In extensive tests in the greenhouses at Beltsville, Arathane (2 capryl-4, 6 dinitrophenyl crotonate) has been found to be more effective against powdery mildew and the parathion-resistant two spotted spider mite, than any of the previously used chemicals. Commercial growers are now using it.
14. Soft scald of apples can be prevented by first storing the fruit at 34°F. for 8 weeks prior to lowering the temperature to 31°. Commercial adoption of this practice was effective in preventing soft scald in a 300-car lot storage house.
15. Modified icing services reduce cost of shipping Florida citrus. Transportation tests from Florida to New York have shown that during fall, winter, and early spring, one re-icing in transit was as satisfactory as several, and that half-stage icing was as satisfactory as full-bunker icing when standard refrigeration was used. Use of only one re-icing would save the shipper about \$90 per car on shipments to certain eastern seaboard cities, and the use of half-stage icing instead of full-bunker icing would save about \$20 per car.
16. Many transparent films found suitable for prepackaging fruits and vegetables. Sixteen out of 27 films tested are about equally suitable. The tests indicated that the film should be selected on the basis of permeability to moisture, tear strength, and cost. Use of such film contributes to convenience and attractiveness in merchandising and retards moisture loss, but does not replace refrigeration and careful handling as the key factors in maintaining quality.
17. Experimental forecasts of late blight of potatoes and tomatoes, based on temperature-humidity relations, have been very accurate in the region where they were tested. It was found that the temperature-humidity combination favorable to the development of blight, i.e., 70° F. or less and 90% relative humidity or more, is not dependent on frequency of measurable rainfall.
18. Recent plant introductions from abroad include (1) a mildew-resistant pea from Peru which is reported to yield twice as much as some 140 other pea introductions being screened, (2) two avocados, one from Tahiti which ripens ahead of commercial varieties now grown, and one from the West Indies which is of superior quality, (3) grapes from Europe developed as crosses between European and American types, (4) a grass introduction from the Near East which has become a popular new range grass for Texas and Oklahoma where it is called the King Ranch Bluestem, (5) two collections of alfalfa from Arabia, which



from tests in Nebraska are reported to be resistant to the leaf hopper, a serious pest, and (6) four collections of beans from Guatemala which are outstanding for their resistance to bean mosaic.

In the search for plant materials as a source for cortisone, several tons of plant materials have been sent to the Eastern Region Laboratory of the Bureau of Agricultural and Industrial Chemistry, for chemical analysis. Cortisone now comes from animal sources and only small quantities can be produced. Currently the best plant source of cortisone appears to be the Agave, a plant found in northwestern Mexico, which might also be grown as a source of fiber. There are many Agave species and not all have yet been examined. A truly satisfactory source of cortisone has not yet been found and the search for a better plant material than those now available is continuing. The work is coordinated with the research program of the Public Health Service.

### FOREST DISEASE INVESTIGATIONS

Losses from forest diseases approach or exceed the losses from fire. Research is conducted to develop methods for preventing or controlling diseases on the millions of acres of national forests, parks, and other timbered areas, and diseases of shade trees and forest products. The information developed serves the Forest Service and other governmental bureaus, State forestry agencies, municipalities, and private owners, and these agencies cooperate in the investigations especially by providing facilities for the research work. The work consists primarily of (1) identifying diseases of forest trees and products and determining their life cycles, and (2) developing effective and economical control methods and management practices, including the development of disease-resistant varieties.

#### Selected Examples of Recent Progress:

1. Oak wilt research initiated. Little had been known about this new disease which has now been found in 16 mid-western and eastern states. Studies of the disease were initiated in fiscal year 1951. Laboratory investigations have resulted in the discovery of the perfect spore stage of the fungus. It was produced by growing together in culture single spores of the fungus from different localities. This is an important step in discovering how the disease is spread over long distances. The oak wilt fungus was also isolated from dying Chinese chestnut trees in a planting in Missouri and proof established that it is a virulent parasite on these trees now being extensively planted in forests and nut orchards.
2. Wilt-resistant Mimosa trees released. Two selections, Tyron and Charlotte, which have successfully resisted the wilt disease in inoculation and field tests over the past 10 years, were made available this year to nurserymen for propagation and eventual distribution.
3. Hybrid poplars developed for pulpwood tested for disease resistance. To meet the rapidly increasing demand for pulpwood, new fast growing poplars are being produced by foresters. Some plantations of these hybrids have been destroyed by canker diseases. Such losses can be

avoided by planting disease-resistant hybrids. One hundred seventy-nine hybrid lines have been tested and twenty-five of them were found resistant to the most important canker disease.

4. Methods for decay protection for exterior woodwork tested. Methods which were tested over a 9-year period included oil-carried preservatives applied by brush, dip, and short period soaks. Brush and dip applications of pentachlorophenol and copper naphthenate have given a high degree of protection when the wood was painted soon after treatment; soaks of 15 minutes or longer, followed by painting, have given almost complete protection to wood not in contact with the soil.

## SOILS, FERTILIZERS, AND IRRIGATION INVESTIGATIONS

Research is conducted in the following four related fields:

Soil improvement, management, and irrigation investigations, including studies of fertilization, liming, tillage, crop rotation, and other production practices. These investigations are conducted at 43 field locations in dry-land, humid, and irrigation regions and are supported by basic laboratory investigations into soil-plant relationships, including studies of tilth, moisture, fertility, and soil organisms. Salinity problems related to soil and crop management are also studied.

Fertilizer, liming material, and soil amendment investigations to improve the properties, efficiency, and availability of these materials to plants. Farmers now use annually approximately 46 million tons of these materials having a retail cost of about 900 million dollars.

Soil surveys to classify soils in a national system. Soil maps and reports are published for use in recommending and applying soil and crop management practices on individual farms and for numerous land-use programs of Federal and State agencies.

Basic research regarding the effects upon plant nutrition of various mineral elements and growth factors in the soil and, through plants used as food, the effect of these elements on animal and human nutrition.

The whole soils program is closely integrated with the soils work of State agricultural experiment stations, the Soil Conservation Service, Bureau of Reclamation, and other Federal agencies. Such integration and cooperation facilitates effective planning and research on the most urgent problems.

Specific problems to which efforts are being directed include:

1. The development of improved soil management and crop production practices for newly irrigated lands such as are being developed in the Columbia, Lower Colorado, Missouri and other river basin areas, and also for the older irrigation projects.
2. Improvement of mixed fertilizers of higher analysis by granulation to better the properties affecting packaging, storage and availability of nutrients to plants.



3. Preparation of reconnaissance and detailed soil surveys of lands under consideration for development through irrigation or drainage in several river basins.
4. Increased production of feed crops in the South through better fertilizer practices and cropping systems.
5. More accurate determination of the availability and use of nutrient materials by plants by use of radioactive materials.
6. Determination of the fertility needs and management practices for maintaining and improving productivity of dry-land areas where fertility levels are now declining.
7. Improvement of the nutritive value of plants for human consumption and as a means of avoiding nutritional troubles in animals by studying the effects of fertilizer applications and other variables on the vitamin and mineral content of plants.

Selected Examples of Recent Progress:

1. Good crop rotations double yields under irrigation. At the Huntley, Montana Irrigation Field Station, the average acre yield of crops in the best rotations was approximately twice as high as the average yield for the same crops on the entire reclamation project. Acreage yields compared as follows: alfalfa, 5.4 tons and 2.3 tons; corn, 77 bushels and 30 bushels; oats, 104 bushels and 39 bushels; barley, 70 bushels and 34 bushels; and sugar beets, 19 tons and 13 tons.
2. Forage yields increased on irrigated mountain meadows. Investigations at Gunnison, Colorado in 1950 cooperative with the Colorado Agricultural Experiment Station, Soil Conservation Service, and local ranchers showed that under the best combination of irrigation, fertilization, and soil management practices the yields of native hay were increased to 3.3 tons per acre as compared with 1.3 tons on check plots. At prices of \$25 per ton, this represents a gross sales increase of \$50 per acre; after deducting the fertilizer cost of \$20 per acre, the net increase would be \$30 per acre. There are approximately 500,000 acres of similar meadow lands in the western states.
3. Studies in Puerto Rico demonstrate methods of increasing yields and reducing soil erosion. In cooperative investigations with Soil Conservation Service, Office of Experiment Stations, and the Puerto Rico Insular Experiment Station, cultivated crops grown in rotations with kudzu, velvet beans, or jack beans have reduced soil losses to within "tolerance limits" and provided sufficient nitrogen for high yields. Cooperative studies with sugar producers have shown that great savings are possible in amounts of water used if improved methods of distribution are installed and applications are properly timed. Improved methods of establishing and managing legume-grass combinations have been developed and gains in weight by native yearling cattle of 400 pounds per acre in a 10-month period have been obtained.



4. Sugar beet yields in Yakima Valley increased by application of gypsum. In cooperative experiments, applications of gypsum at the rate of 10 tons per acre to alkali soils increased sugar beet yields 10.7 tons per acre. When the alkali soil was leached prior to application of the gypsum, the yield increase was 18 tons per acre.
5. Increased quantity of better fertilizers used. Fertilizer consumption in 1949-50 was 18,343,300 tons as compared with 18,541,885 tons used in the previous year. However, because of the higher plant nutrient concentration, the consumption of plant nutrients (nitrogen, phosphorus, and potash) in 1949-50 was 4,061,529 tons, as compared with 3,934,728 tons the previous year, and 1,683,700 tons in 1939-40. Research has made possible the higher analysis fertilizers, thus effecting savings in gross tonnage handled.
6. Native forages of Coastal Plains show mineral deficiencies. 350 samples of forages from the lower Coastal Plain Region of South Carolina were analyzed by the Plant, Soil, and Nutrition Laboratory. These samples clearly show level of cobalt throughout the area so low as to be inadequate to meet the cow's requirements for growth, lactation, and reproduction. Also the phosphorus and calcium contents of these forages were at a minimum.
7. Production and distribution of radioactive fertilizers. In cooperation with the Atomic Energy Commission, facilities of the soil and fertilizer laboratories have been utilized to produce fertilizers containing radioactive isotopes for use in field and greenhouse experiments conducted cooperatively by this Bureau and state agricultural experiment stations. During the past year, 1,500 pounds of fertilizer were produced containing 335 pounds of  $P_2O_5$  (phosphate) and 39 curies of  $P^{32}$  (radioactive phosphorus). This material was used in 39 field experiments conducted in 20 states and Canada. The production of these fertilizers at a central location has made it possible to avoid duplication of highly specialized equipment and specially trained personnel and also encourages wider use of this new tool in agricultural research.
8. Improved method for determining available nutrients in soils. Scientists in the laboratory have developed a formula and procedure for estimating available nutrients in soils which is a great improvement over previous methods. The concept is based on the fact that the plant is the only agent capable of determining the true amount of a nutrient available in the soil. A plant, when confronted with two sources of a nutrient, will take up nutrient from each source in direct proportion to the amount available from each source. The use of radioactive fertilizers permits identifying the nutrient obtained by the plant from added fertilizer from that which the plant obtains from the soil.
9. Technical Assistance to PMA. An increasing amount of time is devoted to consultation with Production and Marketing Administration personnel on soil management and fertilization practices. Several members of the staff have participated in planning conferences which considered the soil amendment practices to be recognized in the agricultural conservation program. This assistance enables the State Agricultural

Mobilization Committees to make a more judicious determination of approved practices involving the use of fertilizer materials in the stepped-up agricultural production program. In addition, 2,115 samples of fertilizer and agricultural lime were analyzed during the year on a reimbursable basis.

10. Soil classification unit established at soils laboratory at Riverside, California. Much of the work of this unit, at least during the first few years, will be concerned with soils now under irrigation or proposed for irrigation. It will include analyses for the amounts and composition of soluble salts, particle size distribution, pH and related properties of soil types. Analyses made of several problem soils in the Provo-Goshen area, Utah, were especially helpful in outlining the size and nature of the difficulties that would follow irrigation of the soils.
11. Soil surveys of proposed irrigation projects in the Missouri Basin covered approximately 400,000 acres in 5 states in 1951. The information gained will be useful in determining the suitability of the areas for irrigation and the soil problems that will be encountered. For example, the soil survey in the Lake Dakota Basin, Spink County, South Dakota shows that approximately one-third of the township consists of soils that are suitable for irrigated crops, one-third of soils suitable for pasture, and one-third of soils not suitable for irrigation. These soils are distributed mainly in small intermingled areas. Irrigation of the better soils, such as the Abbe, Aberdeen, and Bearden series, could change their properties within a few years. Careful handling would be necessary to provide drainage and prevent accumulation of sodium.
12. Soil surveys used for tax assessments. For example, farms of Allamakee County, Iowa, have been reappraised within the past two years with the help of the basic soil survey and the assessor is using the soil surveys and yield estimates for the different soils to explain tax assessments to the people concerned. In two additional counties in Iowa, the county governments are contributing funds for field operations of the soil surveys now under way.
13. Soil map prepared for the Arkansas, Red and White River Basins. The map was prepared in cooperation with state organizations with a scale of approximately 15 miles to the inch. It will be used by the Field Committee of the Department in preparing the agricultural sections of the comprehensive plan for resource development and conservation in these river basins. Tables showing the proportion of each of the different soil associations suited for irrigation and drainage development are being prepared to accompany the map.
14. A revised and enlarged edition of the soil survey manual, first issued in 1937, was published in September, 1951. It will be used as a guide to field scientists of the Department and cooperating agencies in making uniform basic soil surveys. It will also be of value to soils science students and to soil scientists in other countries.



15. Detailed surveys of about 5,440,000 acres (8,500 sq. miles) and reconnaissance surveys of about 2,560,000 acres (4,000 sq. miles) were completed in the 1951 fiscal year. Soil surveys for 8 areas were published bringing the total number to 1,597.

## AGRICULTURAL ENGINEERING INVESTIGATIONS

This research is conducted in the following four major fields:

Farm machinery investigations are concerned with the improvement of farm machinery, equipment, and mechanical methods of planting, cultivating, fertilizing, and harvesting farm crops and combating their insect pests and diseases.

In the past 10 years farmers have changed from hand methods and animal power to machines more rapidly than in any other decade in history. They are using more than twice as many tractors as in 1939. Mechanization is far advanced in several crops, such as small grains and corn, but cotton, tobacco, and other crops including many of the vegetable crops, still require large amounts of hand labor and more mechanization is greatly needed.

Farm structures and related investigations develop more effective barns and animal shelters, better structures for storing crops on the farm, and improve design and utility of farm houses. The farm investment in buildings, including houses, is approximately 20 billion dollars. Part-year storage on the farm for most of the grain, feed and perishable crops is essential to orderly marketing of agricultural products.

Mechanical processing of farm products is concerned with the improvement of equipment and methods for handling and processing products on the farm or at local processing plants. Current studies are concerned with improving the ginning of cotton, the processing of sansevieria, flax and other fibers, and the lay-cut and operation of farm product processing plants.

Farm electrification investigations include the application of electrical energy in the form of power, heat, light and other forms as an aid in the production and processing of agricultural products, and the study of potential new uses of such energy on farms.

### Selected Examples of Recent Progress:

1. Five basic plans for low-cost, expansible farm houses have been developed. In addition, 18 new plans for farmhouses of standard design were prepared, and at the request of FHA, revisions were made to 12 of their old plans. These plans all meet the minimum standards agreed to by the state agricultural colleges throughout the country, the Bureau of Human Nutrition and Home Economics, the Extension Service, and the Farmers Home Administration.



2. Cooling drinking water for beef cattle aids production in California. It was found in cooperative research with the California Agricultural Experiment Station that cooling the drinking water from an average of 88°F. to 65°F. resulted in an increase of 0.4 pounds in daily gain of Hereford cattle over a second group held in adjacent pens, each pen having similar shade and both groups fed the same ration.
3. Equipment and methods for controlling corn borer improved. In cooperation with the Maryland Agricultural Experiment Station a new self-propelled corn sprayer was developed for spraying canning corn which met field requirements as to clearance, power, flexibility, stability, and range of adjustment. Detailed working drawings and specifications were made available to serve as a guide for further developments. In tests in Iowa, one nozzle per row proved to be as effective as two or more nozzles when spraying corn in the whorl stage of growth for control of first generation borer.
4. Peanut harvesting equipment saves labor. Windrow curing and harvesting of peanuts with a combine developed on the project required approximately 4 man hours per acre, as compared with 9 hours when the peanut vines were windrowed or bunched and a semi-combine used, and 32 hours for stacks and a stationary picker.
5. Equipment for harvesting and dehydrating sugar beet tops helps to provide good feed. Studies in Colorado showed that sugar beet tops could be harvested, processed, and dehydrated and a desirable feed produced with significant savings in protein and carotene over ordinary top utilization methods. Equipment was developed or adapted for harvesting beet leaves, and for dehydrating them satisfactorily. Beet tops may make a profitable additional crop for alfalfa dehydrators to handle, thus extending their operating period.
6. Sweetpotato digger improved and recommended for commercial production. Numerous design changes to eliminate various troubles which had been observed were made in the rod-type digger developed in 1948 and 1949. The improved machine was tested on a number of farms with very satisfactory results. When commercially available, this digger should pay for itself at the rate of around \$20 per acre based on present potato prices and labor costs.
7. Special fiber production and processing equipment improved. Research is primarily concerned with three fibers, sansevieria, ramie, and kenaf, which offer possibilities of economical production in this country as substitutes for imported fibers in short supply. A drier has been developed which can be used for all three fibers and operated at a capacity equal to the other machines in the plant so that the processing becomes continuous with potential savings in labor costs. Crop production machinery for other crops, such as planters, cultivators, and weed control equipment, are being adapted to use with these fiber crops.

8. Fiber flax processing equipment studies accelerated through increased assistance from cooperators. Oregon is now furnishing rent-free space in the Santiam Flax Plant for the operation of a full size pilot processing plant, and Oregon and private industry are furnishing power, raw materials, and some labor for running tests. The pilot plant incorporates all of the improved equipment which has been developed by several years of experimental research. An artificial drier for retted flax straw was developed which will eliminate the necessity for hauling the retted flax straw to the fields and back to the plant after field drying. It will facilitate straight line factory operation and reduce costs.
9. Cotton ginning processes developed at Stoneville (Mississippi) laboratory tested at new Cotton Ginning Branch Laboratory, Mesilla Park, New Mexico. A complete series of tests were run to determine the effect upon irrigated cottons of the various ginning processes developed for humid conditions. Such tests will be continued until the evidence indicates which operations must be re-designed to suit cottons grown in low humidity areas.
10. A cotton seed drier has been developed which does an economical job of drying without injury either to germination or the oil properties of the seed. After six months' storage tests, dried seed graded 89 while undried seed graded 77, a loss of 12 points. The cost of drying was \$2.10 per ton of seed; the increased value due to drying was \$5.46, indicating a benefit of \$3.36 per ton.
11. Automatic feed mixer developed. A fluted-wheel metering device, developed cooperatively with the Illinois Agricultural Experiment Station for delivering small grains and supplement to a feed grinder in predetermined ratios has performed well for a year on an Illinois farm. It eliminates the need for mixing feed after grinding. A second labor-saving machine developed in 1950 consists of a semi-automatic device for distributing ground grain to feed bunks for cattle. Several manufacturers have indicated interest in producing both of these developments commercially.
12. More flexible curing allowed with compartment-type brightleaf tobacco barn. The tobacco is moved from compartment to compartment as curing progresses. Such a barn, developed cooperatively with the North Carolina Agricultural Experiment Station, offers the opportunity of curing only small quantities of tobacco at a time. Thus tobacco harvested at different times can be handled separately. The ordinary curing barn must be completely filled and curing started on the same day for best results. The compartmented barn will also do away with the necessity of large working crews for both harvesting and hanging the tobacco in the barn.



## NATIONAL ARBORETUM

The National Arboretum occupies a site of approximately 400 acres in the District of Columbia. Basic developmental work has largely been done, and in recent years trees and shrubs have been transplanted from nurseries to permanent planting sites. However, much material is still maintained in nurseries awaiting transplanting.

A program involving estimated expenditures of approximately \$2,400,000 for the long term development of the needed roads, walks, buildings, and greenhouses was developed in 1947 in cooperation with the National Arboretum Advisory Council. This program, however, has largely been held in abeyance during the past three years as shown by the following tabulation:

<u>Fiscal Year</u>	<u>Appropriation</u>
1948	\$350,000
1949	328,000
1950	70,000
1951	43,950
1952	38,000 a/
	<u>\$829,950</u>

a/ Includes \$3,000 for proposed supplemental due to pay increase.

During fiscal year 1951, activities at the National Arboretum were as follows:

Program for Development of Physical Facilities: With acquisition of a final tract of land which had been delayed because of condemnation proceedings, the Arboretum tract has now been rounded out to approximately 400 acres of land. Fire protection and irrigation facilities have been made available at all strategic points by the completion of some 17,000 feet of water mains. Fences were relocated around the present boundaries, slightly over a mile of new road was graded and surfaced, and about one mile of old road widened and resurfaced.

Operation and Maintenance: In addition to the usual maintenance, a great deal of plant material was moved from the nurseries to permanent locations in the fall of 1950 and spring of 1951. Modern tree moving equipment has facilitated this moving.

Plantings of the Garden Club of America and the Woman's National Farm and Garden Association, Inc. have been expanded and developed. The American Association of Nurserymen is sponsoring a collection of flowering crab apples which will include all the varieties in the United States; about 500 plants representing over 50 varieties have been donated as a start toward this collection.

Nearly 10,000 persons visited the azalea display in April and May when the Arboretum was opened to the public on weekends. This compares with some 8,000 visitors in 1950.



STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Agricultural Marketing Act (RMA--Title</u>			
<u>II), Agriculture (Bureau of Plant</u>			
<u>Industry, Soils, and Agricultural</u>			
<u>Engineering):</u>			
Marketing research and service ....	\$348,272:	\$297,000:	\$351,000
<u>Research on Strategic and Critical</u>			
<u>Agricultural Materials, Agriculture</u>			
<u>(Bureau of Plant Industry, Soils,</u>			
<u>and Agricultural Engineering):</u>			
For research on the development and			
production of domestic crops pro-			
viding strategic and critical agri-			
cultural products under section			
7(b) of the "Strategic and Critical			
Materials Stockpiling Act of July			
23, 1946":			
1. Research on domestic production:			
of natural rubber .....	100,862:	108,000:	108,000
2. Investigations of domestic pro-			
duction of vegetable tannins. :	40,004:	53,000:	53,000
3. Investigations on vegetable and:			
animal fats and oils .....	33,338:	116,000:	116,000
4. Investigations on fiber plants :	60,614:	65,200:	103,400
Total, Research on Strategic			
and Critical Agricultural			
Materials .....	234,818:	342,200:	380,400
<u>Control of Forest Pests, Forest Pest</u>			
<u>Control Act, Agriculture (Bureau of</u>			
<u>Plant Industry, Soils, and Agricul-</u>			
<u>tural Engineering):</u>			
Surveys to determine distribution			
and intensity of forest diseases			
and formulation of recommendations			
for control practices .....	40,293:	41,500:	105,500
<u>Flood Control, Agriculture (Bureau of</u>			
<u>Plant Industry, Soils, and Agricul-</u>			
<u>tural Engineering):</u>			
For use in connection with planning			
the agricultural phases of the de-			
velopment of river basin programs	- -	26,000:	35,000

(Continued on next page)

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Operating Expenses, National Institutes of Health, Public Health Service (Allotment to Agriculture) (Bureau of Plant Industry, Soils, and Agricultural Engineering):</u>			
For research into utilization of plant materials as sources of cortisone .....	59,865:	- -	- -
<u>Mutual Security (Allotment to Agriculture) (Bureau of Plant Industry, Soils, and Agricultural Engineering):</u>			
For investigations directed toward the development of rubber production in the Western Hemisphere ...	366,595:	a/ 160,645:	- -
For investigations of chestnut blight control programs in Italy .	2,833:	7,167:	- -
Total .....	369,428:	167,812:	- -
<u>Working Fund, Agriculture, Agricultural Research Administration (Bureau of Plant Industry, Soils, and Agricultural Engineering) Advanced from:</u>			
<u>Atomic Energy Commission:</u>			
For improvement of soil management and crop production through investigations with radio-active isotopes .....	197,697:	191,298:	- -
<u>Department of Defense, Department of the Army, Office of the Quartermaster General:</u>			
For research related to the formation of rubber in Hevea trees ..	- -	15,000:	- -
<u>Department of Defense, Department of the Army, Chemical Corps:</u>			
For services in breeding seed ...	- -	20,000:	- -
<u>Department of Defense, Department of the Navy:</u>			
For preparation of one or more monographs of plant fibers .....	4,605:	- -	- -
<u>Federal Security Agency, Public Health Service:</u>			
For collection of seeds and plants as possible sources of the drug cortisone .....	1,478:	- -	- -
<u>Interior Department, Bureau of Reclamation:</u>			
For chemical and physical analysis of soils and their relation to irrigation agriculture .....	7,264:	10,736:	- -

a/ Allotment as of December 31, 1951.

(Continued on next page)

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Working Fund, Agriculture, Agricultural</u>			
<u>Research Administration (Bureau of</u>			
<u>Plant Industry, Soils, and Agricul-</u>			
<u>tural Engineering) Advanced from -</u>			
<u>continued:</u>			
<u>General Services Administration:</u>			
For production of seed .....	18,906:	494:	- -
Total, Working Fund, Agriculture,			
Agricultural Research Adminis-			
tration .....	229,950:	237,528:	- -
<u>Working Fund, Agriculture, General</u>			
<u>(Bureau of Plant Industry, Soils, and</u>			
<u>Agricultural Engineering) Advanced</u>			
<u>from:</u>			
<u>Department of Interior, Bureau of</u>			
<u>Reclamation:</u>			
For studies in connection with an			
evaluation of the agricultural			
repayment feasibility of the			
Weber Basin Reclamation Project,			
Utah .....	80:	120:	- -
<u>Department of Defense, Department</u>			
<u>of the Army:</u>			
To cover the cost of providing			
data in connection with a com-			
prehensive survey of the			
Arkansas-White-Red River basin	17,796:	- -	- -
Preparation of strategic maps			
and map material .....	14,650:	41,559:	- -
<u>General Services Administration:</u>			
Production and acquisition of			
guayule seeds and seedlings on			
behalf of the national stockpile:	115,500: a/	58,500:	- -
Total, Working Fund, Agricul-			
ture, General .....	148,026:	100,179:	- -
<u>Working Fund, Agriculture, Agricultur-</u>			
<u>al Research Administration (Trust</u>			
<u>account) Advanced from:</u>			
<u>Reconstruction Finance Corporation:</u>			
For research and survey activities			
relating to continuing and expand-			
ing abaca production in the			
Western Hemisphere .....	107,077:	97,923:	- -
Total, Working Funds .....	485,053:	435,630:	- -

a/ Allotment as of December 31, 1951.

(Continued on next page)



Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
Miscellaneous Contributed Funds, Department of Agriculture (Bureau of Plant Industry, Soils, and Agricultural Engineering):			
Trust funds deposited by non-Federal agencies for cooperative research as follows:			
1. Improvement and management of turf grasses and control of weeds by chemical treatment	3,218:	3,320:	3,320
2. Floricultural research on new methods of production and propagation	- -	60:	- -
3. Cooperative hybrid onion research	3:	- -	- -
4. Production of parent or foundation cotton seed to meet the need of the one-variety program in California	7,650:	8,076:	8,076
5. Spinach breeding and disease investigations	3,395:	5,968:	6,104
6. Research on phytotoxicity of insecticides and fungicides	539:	576:	- -
7. Comparison of methods for accelerated tests of wood decay	4,068:	- -	- -
8. Salt-meal feeding investigations	4,600:	7,000:	7,000
9. Cooperative soil survey work with Central and Southern Florida Flood Control District:	13,000:	37,000:	- -
10. Brush control and range improvement investigations	- -	3,000:	3,000
11. Research into varieties of wheat resistant to stem rust	- -	10,000:	- -
12. Investigations on the effect of insecticides and fungicides on crop plants	- -	4,000:	4,000
13. Corrosion studies with pesticides on application equipment:	- -	8,500:	8,500
14. Maintenance of breeding stock collections of sugarcane varieties, Summit, Canal Zone	- -	5,000:	- -
Total, Miscellaneous Contributed Funds	36,473:	92,500:	40,000

(Continued on next page)

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
Obligations under reimbursements from			
Governmental and other agencies:			
Salaries and expenses .....	212,283	209,000	202,000
Research on strategic and critical agricultural materials .....	6,157	2,700	2,700
Agricultural Marketing Act (RMA-- Title II) .....	9,212	- -	- -
Total .....	227,652	211,700	204,700
TOTAL, OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS .....	1,801,854	1,614,342	1,116,600

## PASSENGER MOTOR VEHICLES AND AIRCRAFT

### Passenger Vehicles

The 1953 estimates contemplate the replacement of 25 automobiles at an estimated net cost, after allowance for old vehicles to be exchanged, of \$27,500. This number represents approximately 12 per cent of the total number of automobiles operated. At the time of trade-in, each of the cars to be replaced will be six or more years old or will have an estimated mileage of over 60,000 miles. It is estimated that they will average 12 years of service when replaced. Cars are essential for use by research workers where other means of transportation are inadequate or not available. The average age and mileage of the cars to be replaced are considerably above an efficient operating level and replacements should be made as soon as possible. There has been no change in the research program which would permit reducing the total number of cars.

### Aircraft

The 1953 estimates provide for the acquisition of one airplane required in connection with research for the development of improved equipment for airplane application of dusts, sprays, seeds, and fertilizers as explained more fully under "changes in language".





BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Purpose Statement

The Bureau of Entomology and Plant Quarantine as now established was formed in 1934 by consolidation of two existing bureaus and by adding certain functions previously carried on by other agencies of the Department. Federal research in entomology goes back to 1854. In 1878, a Division of Entomology was established in the Department of Agriculture, and in 1904 a Bureau of Entomology was organized.

The Bureau is authorized to perform the following activities:

1. Study the distribution, abundance, host plant relationships, life history, and habits of insects which are injurious or beneficial to agriculture and forestry, with a view to developing practical methods for destroying the harmful ones and promoting the increase and spread of the beneficial ones.
2. Investigate the habits and develop means for control of all insects annoying or affecting the health of man and animals, infesting human habitations, or injurious to industries.
3. Conduct chemical investigations to develop new insecticides and conduct research to improve methods and equipment for their application.
4. Apply control measures directed at eradication, suppression or prevention of spread of insect pests and plant diseases in cooperation with Federal, State and local agencies, private organizations, and in certain instances with the governments of Canada and Mexico.
5. Enforce quarantines and restrictive orders to prevent the entry into the United States of dangerous plant pests and to regulate the importation of nursery stock, fruits, vegetables, cotton, and other plants and plant products likely to carry pests.
6. Enforce plant quarantines to prevent the spread of plant pests which have gained a limited foothold, cooperating with States in these activities.
7. Inspect and certify as to freedom from injurious pests and plant diseases plants and plant products intended for export, in order to meet the sanitary requirements of the countries to which shipments are consigned.

The work of the Bureau on insect investigations is carried on in cooperation with state colleges, agricultural experiment stations, other agencies of the Federal government, associations, commercial growers, livestock

owners and beekeepers. The Bureau cooperates with States and local agencies in combatting insects and plant diseases, and in surveys to detect incipient and emergency outbreaks of insects and plant diseases.

The Bureau of Entomology and Plant Quarantine maintains its headquarters at Washington, D. C., with five regional administrative offices and approximately 500 laboratories or stations located throughout the United States and in Alaska, Hawaii, Puerto Rico, Mexico, France, and Egypt. The Bureau as of November 30, 1951, had a total of 2,227 full-time employees, 222 of whom were in Washington, and the balance in the field, and 242 part-time employees, employed during the active season of the respective programs, including those engaged in work on the control of forest pests. This latter activity is described in a separate section of these notes.

	Estimated, <u>1952</u>	Budget Estimate, <u>1953</u>
Appropriated funds:		
Salaries and expenses	\$12,448,000	\$12,300,000
Control of Emergency Out- breaks of Insects and Plant Diseases	<u>1,000,000</u>	<u>1,000,000</u>
Total appropriated funds	<u>13,448,000</u>	<u>13,300,000</u>



Summary of Appropriations, 1952 and Estimates, 1953

(Amounts for 1952 include estimated pay adjustment supplementals)

Item	Total estimated available, 1952 a/	Budget estimates, 1953	Increase (+) or Decrease (-)
Salaries and Expenses:			
Insect Investigations .....	\$3,915,500:	\$3,869,000:	-\$46,500
Insect and Plant Disease Control .....	5,739,900:	5,672,000:	-67,900
Plant Quarantines .....	2,792,600:	2,759,000:	-33,600
Total, Salaries and expenses	12,448,000:	12,300,000:	-148,000
Control of Emergency Outbreaks of Insects and Plant Diseases	1,000,000:	1,000,000:	- -
Total, direct annual appropria- tion or estimate .....	13,448,000:	13,300,000:	-148,000

a/ Adjusted for comparability with the appropriation structure proposed in the 1953 Budget estimates.

The Budget estimates propose the transfer of the projects "Grasshopper and Mormon cricket control" and "Special surveys" from the appropriation "Control of Emergency Outbreaks of Insects and Plant Diseases" to the appropriation "Salaries and Expenses," subappropriation "Insect and plant disease control." This proposal would simplify the appropriation structure and the administrative functions of the Bureau, and would in no way affect the nature and scope of the work being conducted. This action would transfer to Salaries and Expenses all regular control work, leaving the appropriation "Control of Emergency Outbreaks of Insects and Plant Diseases" item to consist entirely of the contingency fund for emergencies.

The work proposed to be transferred is described as follows:

The work on Grasshopper and Mormon cricket control consists of (a) assisting in surveys to determine areas where outbreaks are developing, (b) assisting states in demonstrating recommended control procedures where particularly difficult problems are encountered, (c) assisting states and local agencies in the organization of control districts where grasshoppers and Mormon crickets are a recurring problem, (d) advising with states concerning plans for local control and for coordination when the problem includes several states, and (e) cooperating with states in the prompt suppression of small outbreaks that threaten to disperse over wide areas if not given immediate attention.

In the past three years new procedures have been developed which make more effective and greatly simplify grasshopper and Mormon cricket control both in crop areas and on native grass range lands. This has been due in large part to the availability to farmers of new, improved chemicals which they can purchase individually and apply to protect their

crops against damage. By carrying out the functions described above, it is believed that future emergencies may to a large extent be prevented. When individual effort proves inadequate it is expected that Federal participation would be necessary only after farmers and ranchers have organized local control districts to insure area-wide application of control procedures, and after a substantial part of the cost of control has been provided by state and local agencies. Should an emergency situation develop warranting Federal participation beyond technical assistance, a recommendation would be made for the release of funds from the item "Control of Emergency Outbreaks of Insects and Plant Diseases." Except under these conditions and when outbreaks develop on Federal lands, need for Federal participation beyond technical assistance in the form of surveys, and the development and demonstration of newer improved procedures is not anticipated. Thus the anticipated normal requirements of grasshopper and Mormon cricket control may be considered comparable to other programs financed under Insect and Plant Disease Control.

Special surveys consist of surveys to detect the status and occurrence of insect pests. In cooperation with State agencies, industry groups and others, several different surveys are being conducted. The pests covered include: cotton insects, insects attacking deciduous fruits, insect pests of vegetables and similar crops including tobacco, corn borer, and screwworm. The purpose of these surveys is to develop current data on status and distribution of important pests and information on the availability of insecticides in areas where they are needed. The data are pooled, summarized and made currently available--usually weekly during active seasons--to extension agencies to aid in advising farmers, and to the industry to aid in the distribution of insecticides and spraying and dusting equipment to the areas where needed and when they will be used by the farmers. These activities have been of increasing value and are closely followed by farmers and industry. They have done much to assure that supplies are available when and where needed and to guide farmers on when to protect crops to prevent losses. Most of the weekly reports on insect infestations are sent to as many as 1,250 individuals and concerns. The interest and cooperation by State agencies and others are increasing.

The following table compares the existing appropriation and project structure with that proposed in the 1953 Budget estimates.



PROPOSED CONSOLIDATION OF APPROPRIATION ITEMS OR REVISION OF ACTIVITY SCHEDULES  
(Based on Amounts Appropriated for 1952, Including Anticipated Pay Adjustment Supplementals Pursuant to Public Law 201, Approved October 24, 1951)

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Present Structure		Proposed Structure	
Appropriation Item and Financial Projects	Total Amount	Appropriation Item and Financial Projects	Total Amount
<b>SALARIES AND EXPENSES:</b>			
1. Insect investigations	\$3,915,500	1. Insect investigations	\$3,915,500
2. Insect and plant disease control	4,897,900	2. Insect and plant disease control	5,739,900
(a) Japanese beetle control	503,700	(a) Japanese beetle control	503,700
(b) Sweetpotato weevil control	242,300	(b) Sweetpotato weevil control	242,300
(c) Mexican fruitfly control	175,100	(c) Mexican fruitfly control	175,100
(d) Phony peach and peach mosaic eradication	163,700	(d) Phony peach and peach mosaic eradication	163,700
(e) Barberry eradication	712,600	(e) Barberry eradication	712,600
(f) Pink bollworm and Thurberia weevil control	1,255,200	(f) Pink bollworm and Thurberia weevil control	1,255,200
(g) Golden nematode control	394,000	(g) Golden nematode control	394,000
(h) Citrus blackfly control	95,300	(h) Citrus blackfly control	95,300
(i) White-fringed beetle control	714,500	(i) White-fringed beetle control	714,500
(j) Hall scale eradication	86,700	(j) Hall scale eradication	86,700
(k) Gypsy and brown-tail moth control	554,800	(k) Gypsy and brown-tail moth control	554,800
3. Plant quarantines	2,792,600	3. Plant quarantines	2,792,600
Total, Salaries and Expenses	11,606,000	Total, Salaries and expenses	12,448,000
<b>CONTROL OF EMERGENCY OUTBREAKS OF INSECTS AND PLANT DISEASES</b>			
(a) Grasshopper and Mormon cricket control	1,842,000	(a) Grasshopper and Mormon cricket control	1,000,000
(b) General surveys	578,800	(b) General surveys	1,000,000
(c) Contingency fund	263,200	(c) Contingency fund	
Total, Bureau of Entomology and Plant Quarantine	1,000,000	Total, Bureau of Entomology and Plant Quarantine	
Total, Bureau of Entomology and Plant Quarantine	13,448,000	Total, Bureau of Entomology and Plant Quarantine	13,448,000





(a) Salaries and Expenses

	<u>Insect Investigations</u>	<u>Insect and Plant Disease Control</u>	<u>Plant Quarantines</u>	<u>Total</u>
Appropriation Act, 1952 .....	\$3,650,000	\$4,600,000	\$2,600,000	\$10,850,000
Anticipated pay adjust- ment supplemental ...	+265,500	+297,900	+192,600	+756,000
Activities transferred in 1952 estimates from "Control of Emergency Outbreaks of Insects and Plant Diseases" .	- -	+842,000	- -	+842,000
Base for 1953 .....	3,915,500	5,739,900	2,792,600	12,448,000
Budget Estimate, 1953 .	3,869,000	5,672,000	2,759,000	12,300,000
Decrease (due to partial absorption of pay adjustment costs) ....	-46,500	-67,900	-33,600	-148,000

PROJECT STATEMENT

Project	1951	1952 (estimated)	Decrease (pay adjustment absorption)	1953 (estimated)
1. Insect investigations:				
a. Insects affecting				
food, feed, and				
fiber crops .....	\$2,870,193	\$2,730,300	-\$32,500	\$2,697,800
(1) Fruit insects, including fruit- flies .....	(1,046,607)	(887,000)	(-10,600)	(876,400)
(2) Truck crop and garden insects ...	(488,243)	(467,800)	(-5,500)	(462,300)
(3) Cereal and forage insects ...	(535,804)	(596,700)	(-7,100)	(589,600)
(4) Cotton insects .	(259,741)	(250,300)	(-3,000)	(247,300)
(5) Bee culture and biological control	(272,816)	(279,700)	(-3,300)	(276,400)
(6) Stored products insects .....	(266,982)	(248,800)	(-3,000)	(245,800)
b. Insects affecting forests and forest products .....	494,791	485,800	-5,800	480,000
c. Insects affecting man and animals ....	221,668	249,500	-2,900	246,600
d. Plant pest control investigations .....	421,600	449,900	-5,300	444,600
(1) Classification and occurrence of insects .....	(180,687)	(196,500)	(-2,300)	(194,200)
(2) Insecticide and fungicide .....	(240,913)	(253,400)	(-3,000)	(250,400)
Subtotal .....	4,008,252	3,915,500	-46,500	3,869,000

Project	1951	1952 (estimated)	Decrease (pay adjustment absorption)	1953 (estimated)
2. Insect and plant disease control:				
a. Japanese beetle control .....	\$499,348	\$503,700	-\$6,000	\$497,700
b. Sweetpotato weevil control .....	225,337	242,300	-2,600	239,700
c. Mexican fruitfly control .....	168,249	175,100	-2,100	173,000
d. Phony peach and peach mosaic eradi- cation .....	154,118	163,700	-1,900	161,800
e. Barberry eradication	679,346	712,600	-8,500	704,100
f. Pink bollworm and Thurberia weevil control .....	1,175,806	1,255,200	-14,900	1,240,300
g. Golden nematode control .....	373,618	394,000	-4,700	389,300
h. Citrus blackfly control .....	89,549	95,300	-1,100	94,200
i. White fringed beetle control .....	713,222	714,500	-8,500	706,000
j. Hall scale eradica- tion .....	104,424	86,700	-1,000	85,700
k. Gypsy and brown-tail moth control .....	557,821	554,800	-6,600	548,200
l. Grasshopper and Mormon cricket control .....	812,795	578,800	-6,900	571,900
m. Special surveys ...	200,636	263,200	-3,100	260,100
Subtotal .....	5,754,269	5,739,900	-67,900	5,672,000
3. Plant quarantines ...	2,372,181	2,792,600	-33,600	2,759,000
Unobligated balance ....	210,850	- -	- -	- -
Total pay adjustment costs .....	[- -]	[870,000]	[+11,000]	[881,000]
Total available or estimate .....	12,345,552	12,448,000	-148,000(1)	12,300,000
Transferred in 1952 estimates to:				
"Salaries and ex- penses, Office of Information, Agri- culture" .....	+700	- -		

(Continued on next page)



Project	1951	1952 :(estimated):
Transferred in 1952		
estimates from:		
"Control of forest		
pests, Agriculture"		
gypsy and brown-		
tail moths .....	-\$557,821:	- -:
"Control of emergency:		
outbreaks of		
insects and plant		
diseases, Bureau		
of Entomology and		
Plant Quarantine,		
Agricultural		
Research Adminis-		
tration .....	-1,013,431:	-\$842,000:
Reduction pursuant to		
Sec. 1214 .....	+187,200:	- -:
Anticipated pay adjust-		
ment supplemental ....	- -:	-756,000:
Total appropriation or		
estimate .....	10,962,200:	10,850,000:

#### DECREASE

(1) A decrease of \$148,000 due to partial absorption of pay adjustment costs. The decrease would be met by curtailing insect investigations by \$46,500. Of this amount \$32,500 would be applied against investigations of insects affecting food, feed, and fiber crops; \$5,800 against research on insects affecting forests and forest products; \$2,900 against research on insects affecting man and animals; and \$5,300 on the identification and classification of insects and insecticide and fungicide investigations. Control programs such as those conducted against the Japanese beetle, sweetpotato weevil, citrus blackfly, and others would be curtailed by \$67,900. The funds for the enforcement of domestic and foreign plant quarantines would be reduced by \$33,600.

# CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed with brackets):

## Preamble

1 \* \* \* for carrying into effect the provisions of the Plant Quarantine Act of August 20, 1912, as amended (7 U.S.C. 151-167), the Honey Bee Act (7 U.S.C. 281-283), the Insect Pest Act (7 U.S.C. 141-144), the Mexican Border Act (7 U.S.C. 149), the Act of May 9, 1938, relating to grasshoppers, Mormon crickets, and chinch bugs (7 U.S.C. 148-148e), and the Organic Act of 1944 (7 U.S.C. 147a), as amended, authorizing the eradication, control, and prevention of spread of injurious insects and plant pests; including the operation and maintenance of airplanes and the purchase of not to exceed two, as follows:

2 \* \* \* For carrying out operations or measures to eradicate, suppress, control, or to prevent or retard the spread of Japanese beetle, sweetpotato weevil, Mexican fruitflies, phony peach and peach mosaic, cereal rusts, pink bollworm and Thurberia weevil, golden nematode, citrus blackfly, white-fringed beetle, Hall scale, and gypsy and brown-tail moths, and grasshoppers, Mormon crickets, and chinch bugs in accordance with the Act of May 9, 1938 (7 U.S.C. 148-148e), \* \* \* and for cooperation with States in the compensation of growers for losses resulting from the destruction of or for not planting potatoes and tomatoes on lands infested or exposed to infestations of the golden nematode

3 for the purpose authorized by the Golden Nematode Act ([Public Law 645, approved June 15, 1948), \$4,600,000] 7 U.S.C. 150-150g), \$5,672,000: \* \* \*

The first and second changes are proposed to include provision under this appropriation to carry out operations to combat grasshoppers and Mormon crickets, in accordance with the proposed transfer in the 1953 estimates of grasshopper and Mormon cricket control activities and the special surveys to this appropriation item from the appropriation "Control of Emergency Outbreaks of Insects and Plant Diseases". As explained above in more detail, due to the availability to farmers of new, improved chemicals which they can purchase individually and apply to protect their crops against damage, the Bureau's programs for these items have materially changed and they are now similar to operations financed from the subappropriation "Insect and Plant Disease Control". This proposal would not affect in any way the nature of the control programs which would continue to be conducted in the same manner as in the fiscal year 1952. This change would permit the financing of the continuing phases of the grasshopper, Mormon cricket, and chinch bug control programs from the same appropriation which provides for other similar operations within the Bureau. Should emergency outbreaks of these insects occur, a recommendation would be made that control measures be financed from the subappropriation "Control of emergency outbreaks of insects and plant diseases."

The third change is for the purpose of inserting the U. S. Code citation to the Golden Nematode Act in lieu of retaining the Public Law reference.

STATUS OF PROGRAM

INSECT INVESTIGATIONS

Current Activities include studies on the distribution, abundance, host relationships, life history, habits, and methods of control of insects and the development of means of the utilization of natural enemies for the control of insect pests, including the importation of natural enemies of introduced pests which are injurious to agriculture and forestry. The work is carried on, through field tests and laboratory experiments, in practically every state, in Hawaii, Puerto Rico, Panama, and Mexico, and headquarters for foreign parasite work are maintained in France. Most of the activities involve cooperation with state colleges, agricultural experiment stations, other agencies of the Federal government, associations, commercial growers, livestock owners and beekeepers.

Insect pests affect all phases of agriculture, and are important problems in many industrial activities and in the home. The importance of a strong continuing research program to develop improved control methods is emphasized by the fact that losses inflicted by insect pests approximate four billion dollars annually.

Research objectives include the following general purposes:

1. To develop means whereby the growers of fruits, nuts, truck and garden crops, cereal, forage and range crops, cotton, tobacco, sugar plants and other agricultural products, can control insect pests more effectively or more economically, thus increasing the net returns from their operations and insuring an ample supply of high-quality agricultural products.
2. To devise the most effective and economical means of preventing or controlling insect damage to forest and shade trees, forest products and shrubs.
3. To devise and improve methods of utilization of the honey bee for the production of honey and wax, and for the pollination of crops.
4. To develop control measures for those insects which transmit disease, annoy man, and attack livestock.
5. To devise the most effective and economical means of preventing or controlling insect damage to stored agricultural products, foods and fabrics.
6. To identify insects and allied organisms for the quarantine, control and research activities of the Bureau and for other Federal and State agencies, farmers, pest control operators, and other private individuals of the United States, as well as for foreign institutions; and to collect, maintain, and furnish information as to the presence and abundance of insect pests.



7. To develop methods and apparatus for freeing commodities of pests under plant quarantine regulations so that they can move freely and safely in commerce.
8. To improve the chemical materials now employed in controlling insects, to develop new and better chemical materials and to devise improved apparatus and methods for their application.

#### Examples of Recent Progress and Trends

##### Insects Affecting Food, Feed, and Fiber Crops

##### Fruit Insects, Including Fruitflies:

1. Introduced parasite of the Japanese beetle of great value in natural control. The spring Tiphia, a small wasp-like parasite that lays its eggs in Japanese beetle grubs in the ground, has been introduced from Japan. It has been released at more than 2,000 beetle infested areas through the East. Surveys undertaken in the spring of 1950 and 1951 show that it has become established at nearly all points of release and that it has spread for distances of up to 25 miles from such points. This parasite often kills 30 to 60 percent or more of the grubs present.
2. Methoxychlor sprays and dusts found to be nearly as effective as D T against the Japanese beetle. Spray applications on corn may be made with ground equipment or aircraft. The hazard to humans and growing plants is low. Unlike DDT it has little or no tendency to accumulate in body fat or to appear in meat or milk. It may, therefore, meet the need for a material that can be safely used to control the Japanese beetle on corn to be utilized as fodder or silage for feeding dairy cows or cattle that are being finished for slaughter.
3. Several methods of treatment developed to permit movement of fruits and vegetables from Hawaii in spite of the oriental fruit fly. Because of the threat to mainland agriculture, fruits and other products subject to attack by the oriental fruit fly can be moved from Hawaii to the mainland only after fruit fly infestation has been eliminated in each shipment. Several methods of treatment have been developed for different products. The most important of these is fumigation with ethylene dibromide, which is effective in killing fruit fly eggs and maggots at a very low dosage - 1/2 pound per 1,000 cubic feet for 2 hours. Other successful methods for certain products are the vapor heat treatment and fumigation with methyl bromide.
4. Experiment in large-scale control of oriental fruit fly successful. In this experiment all important known areas on the island of Lanai in which the fruit flies were breeding or concentrated were treated several times in succession. Following these treatments, the numbers of flies dropped materially. Complete eradication was not expected because flies are continually reaching Lanai

from other islands. Also, there may have been very light fruit-fly populations in untreated areas. The experience gained with large-scale control methods while valuable in island control would also be most helpful in developing an eradication program if an infestation should be discovered on the mainland. The insecticides used in the large scale test on Lanai were selected after intensive laboratory screening and small field plot tests on Oahu had indicated their unusual promise for oriental fruit fly control.

5. Oriental fruit fly in Hawaii reduced by introduced parasites.

Over 20 species of parasites and other natural enemies have been introduced and released in the Islands. Three of these enemies are well established and are killing off large numbers of oriental fruit flies or their maggots. This development is most encouraging.

6. Fruit flies. Experiments on a new development in vapor-heat sterilization of citrus and mangoes to kill the Mexican fruit fly have been carried on with some fifty tons of infested fruit containing about seven million larvae. They indicate the probability of perfecting a more rapid process to permit the movement of fruit from infested to noninfested areas.

Truck Crop and Garden Insects:

1. Sweetpotato seedlings show resistance to weevil attack. For the past several years two varieties of sweetpotato seedlings have shown consistent resistance to attack by the sweetpotato weevil in field plot tests conducted in cooperation with plant breeders in Louisiana.

Cereal and Forage Insects:

1. Low dosage of aldrin effective against grasshoppers. Two ounces of aldrin in one gallon of oil per acre as a spray has been successfully used and is now recommended for general use. Because of the much smaller quantities of aldrin needed to kill grasshoppers, it has, to a large extent, replaced toxaphene and chlordane. Not only has widespread use of aldrin been made in the United States but also Iran successfully used it in a large anti-locust campaign. Experimentation has shown the possibility of even further reduction of dosage with other new insecticides. Sprays have proven to be generally more effective than dusts or baits.
2. Parasites of the European Corn borer on the increase. The introduction and colonization of parasites is beginning to pay dividends. Corn borer larvae collected from the Eastern and North Central States show the highest percent of parasitism ever recorded since the work was started in 1920. This is largely the result of one of the introduced species of parasites.



3. Insecticidal control of wireworms in sugarcane plantings promising. The applications of any of five new insecticides as wettable powders mixed with water and sprayed on sugarcane seed pieces in the open furrow reduced the numbers of wireworms and increased cane yields in Florida. This work was done in cooperation with the Florida Agricultural Experiment Station.
4. Recommendations for the control of the alfalfa weevil and lygus bugs have been made in cooperation with the Utah Agricultural Experiment Station. Early spring treatment of young alfalfa with chlordane will destroy the alfalfa weevil adults. Lygus bugs and alfalfa weevil larvae can be controlled later in the season using other insecticides. More recent experiments have revealed insecticides that may prove even more practical owing to the low dosages necessary.

#### Cotton Insects:

1. Early-season application of insecticides on a community-wide basis gives effective cotton insect control. Community-wide early-season insect control experiments conducted the past three years have lead to the development of a method of boll weevil control which can be used successfully by the average cotton grower. Low-gallonage, low pressure emulsion sprays of new organic insecticides have proven as effective as dusts. These sprays can be applied when weather conditions will not permit the use of dusts, and also during daylight hours when the plants are dry.
2. Insecticides increase cotton yields in Louisiana. In large-scale experiments in 1950 benzene hexachloride, calcium arsenate, toxaphene, aldrin, and dieldrin gave effective control of boll weevil. Infestations of the cotton aphid, the bollworm and spider mites, however, may develop when some of these insecticides are used alone; therefore, insecticidal combinations are essential for a successful insect control program. Experimental tests on 2,127 acres of Madison Parish's 21,000 acres gave an average yield of 532 pounds of lint per acre and exceeded parish average of 367 pounds of lint by 165 pounds, a 45 percent increase. At the price for cotton in 1950 the average increased yield was worth about \$75.00 per acre to the grower.
3. Cultural methods prove to be the most effective and practical means of combatting the pink bollworm. These practices include early uniform planting of quick maturing varieties of cotton, thick spacing, elimination of late irrigation, and chemical defoliation. They stimulate early maturity of the cotton, reduce seasonal increase in the pink bollworm population, and reduce the amount of damage to the crop. It was found that in humid regions, the stalks should be cut immediately after the cotton is harvested and the crop debris plowed under as deeply as possible. In cold arid regions, where the harvest must be completed after frost, the cotton stalks should be left standing during the winter months, since the heaviest pink bollworm mortality is obtained in the bolls on the standing stalks.



Bee Culture and Biological Control:

1. Moving Bee Hives in Alfalfa Field Increases Seed Yields. In 1949 an average yield of 896 pounds per acre of recleaned seed was obtained from a run-down alfalfa field of 132 acres in California on which 5 to 6 colonies of bees per acre were placed for pollination purposes and left unmoved on their stands throughout the blossoming period. In 1950 the same field was provided with about 3 colonies per acre but these were moved in and out of the field at intervals of 7 to 10 days to provide a fresh force of field bees not oriented to visiting plants outside the field. The yield per acre on sampled portions of the field was 1800 pounds of thresher run seed. The 1949 State average was only 275 pounds per acre. The experiments were conducted in cooperation with State agencies, the owner of the crop, and a beekeeper.
2. Bees Increase Cantaloupe Yield by 61 Crates per acre. In experiments conducted in cooperation with State agencies in Arizona; plots of muskmelons supplied with an abundance of honey bees yielded at the rate of 274 crates per acre or 61 crates per acre more than check plots having only the normal concentration of honey bees.
3. Newer Insecticides Highly Dangerous to Pollinating Insects When Used on Blossoming Plants. Experiments in Utah in cooperation with State agencies showed that dieldrin, parathion and lindane are highly dangerous to pollinating insects and, therefore, should never be used on blossoming alfalfa. Aldrin at 1/2 pound or more per acre, chlordane in both spray and dust form, and DDT at 1 pound or more per acre are dangerous and are not recommended for use on blossoming alfalfa. On the other hand, DDT at 1/2 pound or less per acre and toxaphene are relatively harmless to pollinating insects and may be used on blossoming alfalfa as occasion requires.
4. Four of the parasites imported from India and Pakistan in 1950 have become established in blackfly infested areas in Mexico. One species shows promise of controlling this pest in the dry citrus growing areas. Large numbers of these parasites collected from the original colonization points are being liberated in the infested areas to aid in the prevention of spread of this pest to the United States.
5. The two species of leaf-feeding beetles colonized in Oregon and Idaho for control of Klamath weed have increased so rapidly that re-colonization can now be undertaken within those States. Control of this weed continued to expand in California where over 100 square miles is now free of the weed. Additional colonies of both beetles from California have been liberated in Washington and Montana. Two of the three recently imported enemies from Europe have become established in California.

### Stored Products Insects:

1. Cold storage controls cigarette beetle in tobacco. Experiments in cooperation with the tobacco industry in Pennsylvania demonstrated that the infestation of cigar tobacco by the cigarette beetle can be controlled by a three-day exposure to cold storage at -10 degrees F.
2. Saving effected in fumigation of corn stored in steel bins. As a result of research conducted in Commodity Credit Corporation storage bins in Indiana, in cooperation with the Production and Marketing Administration, it is possible to reduce dosages of fumigants recommended for use by skilled operators. With the large volume of grain requiring fumigation this reduction represents an important saving of critical materials.
3. Improved Methods Developed for Control of Clothes Moths and Other Fabric Pests. A new insecticide called lindane improves modern methods for controlling insect pests of woolen fabrics, household furnishings, stored wool, and other commodities.
4. The resistance of laboratory strains of houseflies reared in physiological studies has been increased until they are practically immune to residues of DDT, and such strains quickly develop resistance to any other residual or persistent insecticide, thus presaging the eventual inability of residual type sprays to control houseflies.

### Insects Affecting Forests and Forest Products

1. Pine hybrids resistant to pine reproduction weevil attack give promise of being resistant to bark beetles. Cooperative studies with the Institute of Forest Genetics, California Forest and Range Experiment Station, have shown that some hybrid pines developed by geneticists are resistant to the weevil. This weevil probably constitutes the worst hazard in establishing successful plantings of ponderosa pine in California. Extension of this research to determine whether older hybrid pines might be resistant to attack by pine bark beetles has already produced positive indications.
2. Biological control of pine sawfly. Preliminary tests of a virus disease which attacks the pine sawfly have been made through the cooperation of the Canadian Department of Agriculture. Diseased material furnished by the Canadian laboratory was sprayed by plane on trees infested by a pine sawfly in New Jersey. The results of the test show high sawfly mortality. If such a disease can maintain itself at an effective level in the population of pine sawflies, biological control could avoid the necessity and expense of direct chemical control.



3. White-pine weevil control. The white-pine weevil, the most injurious forest insect in the Northeast, appears to have been controlled quite successfully by applications of insecticide from a helicopter. Recent research has shown that small plantations can be satisfactorily treated by application of lead-arsenate in concentrated form from knapsack sprayers. Research is continuing on the number of treatments which will be needed to protect trees through the most susceptible period of growth. In cooperation with certain Northeastern States research has been started on the prevention of damage by cultural methods.
4. Knowledge of host plant susceptibility to insect attack leads to effective control. A system of determining characteristics indicating trees that may be susceptible to attack by bark beetles in the near future has enabled research men to develop a program of selective cutting of ponderosa pine in certain areas prior to attack. This utilizes valuable timber trees that otherwise would be rendered useless as lumber and prevents the building up of epidemic populations of bark beetles.
5. Dutch elm disease can be reduced by spraying on community basis. Tests of sprays containing DDT applied yearly, for several years, to practically all elm trees in the center of a community have been completed. Such a spraying program greatly reduces the number of diseased trees in comparison to areas remaining unsprayed.

#### Insects Affecting Man and Animals

1. New Screw-worm Remedy Recommended to Livestock Growers. A new screw-worm remedy called W-335 recommended to ranchmen in October of 1950 is now widely used to treat animals for the prevention and control of screw-worm infestations.
2. New Information Developed on the Toxicity of Insecticides to Livestock. The appearance of insecticidal residues in meat and milk of livestock following the use of insecticides for insect control on livestock and on animal forage crops is causing increasing concern to the public. Investigations on the toxicity of insecticides to livestock have shown that two of the newer materials, toxaphene and methoxychlor, are not readily stored in fatty tissues of animals when applied to livestock or when animals consume forage so treated. The new insecticides, dieldrin and aldrin, according to early information, are much more likely to appear as residues under similar conditions of use.
3. Effects of X-rays on Screw-worm Flies. It has been shown that screw-worm flies exposed to X-ray treatments are incapable of reproduction. This information suggests the possibility of utilizing X-ray treatments as an aid in controlling these destructive pests, particularly in the Southeast.
4. Flight Habits of Flies Investigated. Radioactive tracers have been used to tag house flies and blow flies to determine their



flight range. Preliminary tests have demonstrated they will fly at least four miles in one day and as many as 12 miles within a few days. Dispersion studies of this nature help explain the rapid spread of insecticide-resistant flies throughout the United States.

5. Mosquitoes Develop Resistance to Insecticides. Mosquitoes have developed resistance to DDT in Florida and California where the new insecticides have been used for several years. These adverse developments parallel a similar situation that has occurred among house flies in many parts of the United States.
6. Fire Ants Controlled with Chlordane. Chlordane has been found to provide an effective means for controlling the imported fire ant, pest of man, animals, and certain agricultural crops in Alabama, Mississippi, and other southern states.

### Plant Pest Control Investigations

#### Classification and Occurrence of Insects:

Many agencies and individuals aided by insect identification. Identifications essential for determination of correct control procedure were furnished Federal agencies, state agricultural experiment stations, various other institutions and individuals. More than 62,000 samples were handled in the fiscal year 1951, as compared to about 60,000 samples in 1950.

#### Insecticide and Fungicide Investigations:

1. Allethrin-containing aerosols Developed. Insecticidal aerosol formulas containing allethrin, the pyrethrin-like synthetic insecticide discovered by chemists of this Bureau, have been developed and approved for use against household insects. Upon the recommendation of the Bureau, the Army has adopted the use of allethrin in its aerosol bombs in place of pyrethrum, which must be imported and which is in short supply. The production facilities for allethrin are being greatly expanded.
2. Protective Equipment for Insecticide Operators and Farmers. Respirators and gas masks which give efficient protection against dusts, mists and vapors of toxic insecticides such as parathion, tetraethyl pyrophosphate, aldrin, and dieldrin have been developed for use by farmers or other operators handling and applying these materials. This was accomplished through the cooperation of this Bureau, other interested Federal agencies, and manufacturers of respiratory equipment. Devices supplied by the manufacturers were tested by Bureau chemists and the results were evaluated jointly by the cooperating agencies.

3. Methods of Analysis for Insecticide Residues. A method has been developed for the quantitative determination of very small amounts of organic phosphorus insecticides, based on measurement of their enzyme inhibiting power. This method is useful in analysis for spray residues on treated crops. An analytical method also has been developed for minute amounts of methoxychlor in milk and animal tissues and has been utilized in studies of the effects of this insecticide on dairy cows and other livestock.
4. Insecticidal Plant Under Cultivation. Seeds of wild plants of the American weed known as oxeye (Heliopsis scabra), in which an insecticidal amide, called scabrin has been found, were supplied to the Bureau of Plant Industry, Soils, and Agricultural Engineering for the planting of small experimental plots in Maryland and Arizona. Extracts prepared from the roots of these cultivated plants have proved to be more toxic to house flies than the extracts from the wild plants from whose seeds they were grown.

INSECT AND PLANT DISEASE CONTROL

Current Activities provide for protection of American agriculture from certain destructive insect pests and plant diseases, by conducting, in cooperation with States, operations to control, suppress and prevent spread of these pests and plant diseases, including surveys to detect the status and occurrence of insect pests.

Among the undertakings now in process, the following are selected as typical:

1. Retarding the spread of the Japanese beetle to non-infested sections of the United States and suppressing infestations in newly located outlying areas. This involves inspection and certification of commodities likely to carry the beetles from the regulated areas, comprising all or parts of the 15 states in eastern part of the United States.
2. The prevention of spread of the sweetpotato weevil and its eradication from commercial-producing areas. The operations are conducted in cooperation with the States of Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas.
3. The prevention of spread of the Mexican fruitfly from the citrus-producing area of Texas.
4. Suppression and prevention of spread of the phony peach and peach mosaic diseases. These activities are conducted in cooperation with southern states from California to South Carolina.
5. Control of the destructive stem rust disease of wheat, oats, barley, and rye by the eradication of barberries which are the alternate host of the disease. Control work is conducted in 18 grain-growing states.
6. Eradication, suppression, control and prevention of the spread of the pink bollworm from areas where it is now present. These operations are carried on in cooperation with all the major cotton-producing States and the Republic of Mexico.
7. Eradication, suppression, control, and prevention of spread of the golden nematode. These operations are carried on in cooperation with the State of New York, particularly in Nassau and Suffolk Counties where the only known infestations in the United States occur. Precautionary surveys are made in other major potato and tomato-producing States..



8. Citrus Blackfly. Control and regulatory activities in connection with the citrus blackfly in Mexico consist of:
  - (a) Inspections in Mexico to determine location and intensity of inspections.
  - (b) Cooperation with National, State, and local officials in Mexico (1) to control the citrus blackfly and (2) to prevent its spread to uninfested areas. These activities are advisory.
9. Control and prevention of spread of white-fringed beetle. Operations are carried on in cooperation with 8 southeastern states.
10. Eradication of Hull Scale. Activities are conducted in cooperation with the California Department of Agriculture to eliminate this destructive scale insect which is known to occur only in limited areas in that State.
11. The prevention of spread of the gypsy and brown-tail moths. Work is conducted in timberland areas along the western border of the New England section to repel advance to the west and to eradicate progressively to the east.
12. Grasshopper and Mormon cricket control. Surveys are conducted to determine current status of grasshopper populations and such information is made available upon which growers and control groups can plan suppressive programs. Technical assistance is provided to organize control groups in the planning, execution and checking of large scale grasshopper control operations. When emergency grasshopper situations arise, cooperation is effected with states and organized grower groups in carrying out control operations.
13. Surveys to detect the status and occurrence of insect pests. Surveys are currently being conducted on the chinch bug, fire ant, citrus canker, cotton insects, screw worms, and European corn borer, as well as on other pests of deciduous fruits, vegetables and tobacco.

#### Examples of Recent Progress and Trends

##### Japanese Beetle Control:

Officials of 15 States and representatives of 11 associations and business concerns who attended a public hearing held in Washington on March 30, 1951 were unanimous in urging that the Federal Japanese beetle quarantine be continued and that it be extended to include any additional territory considered necessary. Based on the testimony at the hearing, the quarantine has been amended to include the State of North Carolina, and the supplemental regulations have been amended to place under regulation extensive sections of North Carolina, as well as additional areas in New York, Ohio, Pennsylvania, and West Virginia.

Over \$16,000,000 worth of products were certified for movement from the regulated areas. The principal items certified were 123,000,000 plants, 5,200 loads of fresh fruits and vegetables, and 2,070 tons of soil.

Thousands of property owners in hundreds of communities within the infested area purchased and used biological products and insecticides developed and recommended by the Bureau for beetle control. These individuals made significant contributions towards the Bureau's efforts to prevent spread of the insect by reducing beetle populations in heavily infested areas. These direct individual contributions have added many millions of dollars to the financial contributions of affected States.

#### Sweetpotato Weevil:

1. The sweetpotato industry in weevil-infested areas has been revolutionized as a result of special treatments which consist of dusting with DDT. Kiln operators have treated over 2 million bushels of potatoes in the past year and a half and as a consequence have netted a profit of \$1,500,000. The trade is rapidly utilizing recommended better sanitary practices and cultural procedures to the fullest possible extent.
2. The eradication of sweetpotato weevil infestations in West Feliciana Parish, La., is one of the most important project accomplishments in years. This parish is one of the foremost sweetpotato producing areas in the country. When the weevil was first found there the opinion expressed locally was that it could never be eradicated, but could possibly, in time, be brought under control.

#### Phony Peach and Peach Mosaic Control and Eradication:

1. New host plant for phony disease. The recent discovery that wild plum is a host of phony disease introduces another factor into the control problem. The only method of determining its presence in wild plum is to apply a chemical test to the twigs. Limited sampling shows the disease occurs in wild plum in widely scattered localities in Alabama, Georgia, Mississippi, South Carolina and Tennessee.
2. Progress in 1950. Inspection of 7,587,765 peach trees on 48,459 properties resulted in the location and removal of 55,740 trees infected with phony disease, and 5,134 with mosaic in 138 counties in 13 states. In addition, 4,264,799 trees in 306 nurseries in 12 states were inspected for these diseases and all nurseries, except 70 small ones with 8,947 trees; qualified for movement of peach stock under certification. Annual inspection and removal of diseased trees on an area wide basis controls the disease, but this is not effective in individual orchards once they are generally infected.

3. Program status. Cooperative control has resulted in eradication of phony disease in outlying areas in 7 states. Its elimination in commercial areas appears to be nearing completion in 4 additional states. The insects that transmit phony disease from tree to tree have been identified, and sprays are being tested to supplement present inspection and removal methods so as to insure more effective control in remaining outbreak areas in Georgia, Alabama and South Carolina. The elimination of peach mosaic is nearing completion in Utah and Oklahoma, and its abundance in California and Colorado has been greatly reduced.

#### Barberry Eradication:

1. Progress in 1950. Survey and eradication work was conducted in an area comprising 31,261 square miles in 284 counties in the 18 cooperating states. There were 20,731,900 barberry bushes destroyed on 3,826 properties. Rework was brought up to date on 5,000 square miles, and 32,666 square miles were added to the barberry-free territory. Farmers report increased yields and improved quality of small grain in areas where these bushes have been destroyed. Cooperating state and local agencies provided funds and services for this work amounting to \$272,538. (Tables 1 and 2).
2. New rust races cause severe crop losses. Two new races of stem rust, 15B of the wheat variety and 7 of the oat variety, became widespread and destructive for the first time in 1950. These races originated on the barberry. No commercial varieties of wheat or oats are resistant to these new rust races. Race 15B caused losses to the durum wheat crop in North Dakota and Minnesota amounting to 19 million dollars. Race 7 caused local crop losses in the important oat producing regions. Fourteen states have been grouped into 7 areas, field offices reduced from 18 to 11 and 4 states are now financing most of the work. This has permitted redirection of field operations and shifting of emphasis to meet the needs of the program.
3. Program status. As a result of the cooperative program, barberries have been eliminated from 86 percent of the eradication area. As this clean-up job is completed and the treated areas reach a maintenance status, the cooperating states are gradually taking over more of the responsibility for keeping them in that condition. In these areas the Bureau is continuing the coordination of program activities, regulation of host plant movement, and area wide rust surveys.



Table 1 - Results of Barberry Eradication Work - Calendar Year 1950

State	Area Worked Sq. Mi.	Number of Properties Cleared		Number of Bushes Destroyed	
		New	Old	Berberis vulgaris	Native Species* Total
Colorado	247	37	72	109	13,093,380
Illinois	2,028	47	82	541	13,093,489
Indiana	1,717	18	21	80	541
Iowa	2,116	74	49	735	2,000
Michigan	1,559	121	247	4,916	735
Minnesota	7,910	38	62	963	4,916
Missouri	1,289	71	6	842	963
Montana	316	11	24	767	842
Nebraska	1,742	64	4	152	767
North Dakota	1,069	0	2	20	152
Ohio	1,160	73	137	2,875	20
Pennsylvania	1,214	598	827	196,108	2,875
South Dakota	77	44	7	139	196,108
Virginia	1,753	220	127	591	139
Washington	4,384	88	83	11,778	4,320,422
West Virginia	760	23	142	53	4,321,013
Wisconsin	1,887	125	281	2,527	11,778
Wyoming	33	0	1	1	3,092,901
Total	31,261	1,652	2,174	223,197	20,508,703
					20,731,900

\*Berberis Fendleri A. Gray and B. canadensis Mill.

Table 2 - Status of Barberry Eradication through 1950

State	Square Miles		No. of Properties		Barberries					
	In	On	Unworked	With Barberries	:	:				
							Control	On	:	:
Control	On	Unworked	With Barberries	Barberries	Barberries					
	Area	Maintenance	or Requiring	Cleared	On	Requiring:				
			Rework	to date	Maintenance:	Work				
						to date				
Colorado	74,685	72,846	1,839	2,952	1,820	1,132	39,210,069			
Illinois	56,043	46,875	9,168	19,809	8,876	10,933	2,743,694			
Indiana	36,045	32,475	3,570	6,976	5,451	1,525	406,216			
Iowa	56,167	36,708	19,459	15,433	7,709	7,724	1,312,384			
Michigan	57,481	52,824	4,657	18,392	11,366	7,026	6,662,757			
Minnesota	80,883	64,338	16,545	9,014	5,124	3,890	1,004,423			
Montana	146,316	145,911	405	711	451	260	52,288			
Nebraska	77,268	71,916	5,352	4,889	4,436	453	147,214			
North Dakota	70,183	70,163	20	1,081	1,060	21	39,541			
Ohio	40,740	28,173	12,567	17,353	9,765	7,588	3,302,340			
South Dakota	76,868	76,490	378	1,552	1,438	114	136,339			
Wisconsin	54,852	46,681	8,171	17,435	6,702	10,733	5,686,533			
Wyoming	94,487	94,467	20	139	114	25	5,663			
Subtotals	922,018	839,867	82,151	115,736	64,312	51,424	60,709,461			
Missouri	36,016	29,411	6,605	1,550	471	1,079	22,498			
Pennsylvania	22,060	6,510	15,550	9,675	265	9,410	14,547,063			
Virginia	10,937	3,141	7,796	4,558	0	4,558	168,336,748			
Washington	32,662	12,118	20,544	9,407	8	9,399	127,166			
West Virginia	4,949	991	3,958	2,103	0	2,103	150,087,197			
Subtotals	106,624	52,171	54,453	27,293	744	26,549	333,120,672			
Grand Total	1,028,642	892,038	136,604	143,029	65,056	77,973	393,830,133			

#### Pink Bollworm and Thurberia Weevil Control:

1. Inspection for pink bollworm in the regulated area revealed a large increase in degree of infestation in south Texas and in the Pecos Valley and Presidio areas of western Texas. The regulated area in Oklahoma also showed infestation for the first time since 1947, but for the second successive year results in the regulated area of Arizona were negative.
2. Since 1950 new infestations of pink bollworm were found in 61 Texas and 6 Oklahoma counties, 1 county in New Mexico, and 12 parishes of southwestern Louisiana. Inspections were negative in California, Arkansas, Mississippi, Alabama, Georgia, and in Florida outside the everglades area where infestation persists.
3. The new areas of infestation in Texas, Oklahoma, and Louisiana made necessary the placing of the infested counties and those adjacent which were involved in inter-county ginning under State and Federal quarantine. Some 200 cottonseed heat treating machines were installed at the gins in the newly regulated area and seed treating equipment was installed in 17 additional oil mills within or immediately adjacent to the newly infested area.
4. Wild Cotton Eradication Project in Florida. Results of the second year after wild cotton eradication was resumed showed very little change in the number of cotton-free locations. There was a decided decrease in the number of plants, lessening the possibility of seed reaching the ground. Cooperation with the Everglades National Park remained at a high level.

#### Golden Nematode Control:

1. During the past year a survey of all important potato-growing areas of the United States begun in 1949 to determine the presence or absence of the golden nematode was completed, and no nematodes were found.
2. An important feature of this survey was to train state pest control officials in survey procedure and to demonstrate to them the special equipment that is used so that in the future they can assume the greater share of the responsibility for detection work in their states.
3. Surveys in the principal potato producing states fail to disclose infestations outside Long Island, New York. During the past fiscal year, extensive surveys were undertaken cooperatively with thirty-nine states.

#### Citrus Blackfly Survey:

Survey crews have operated in the States of Tamaulipas, Nuevo Leon, Sonora and Baja California in areas contiguous to American citrus production in Texas, Arizona and California. Infestations



have been found on citrus trees in all areas inspected with the exception of Baja California. This work is carried on in co-operation with the Mexican Department of Agriculture and the local Mexican Blackfly Committee. Trees on almost 30,000 properties were inspected; over 375,000 citrus trees were examined, and over 100,000 man-hours of work were devoted to the problem. As a result of this work, infestations of the citrus blackfly were found on 924 citrus plantings. Many of these infestations were found on trees in dooryard plantings in the towns and cities such as Victoria, Montemorelos and Monterrey.

#### White-fringed Beetle Control:

1. Populations of the white-fringed beetle have been reduced materially through the cooperative Federal-State-grower control programs. Slightly over 306,000 acres have been considered infested in 139 counties in 8 states. However, during the past year no specimens were found in 22 of these counties so classified.
2. In order to maintain the DDT residual at an effective level in treated soil, a method has been adapted and recommended whereby the grower may incorporate DDT in a fertilizer application to be applied by the regular means of his farm equipment and operations. This application is made several years after the initial soil treatment. The rate of application is from 2 lbs. to 3 lbs. DDT per acre. Between 400 and 600 lbs. fertilizer is used per acre, of which  $1/2$  of 1 percent is DDT. During this year some 600 tons of fertilizer containing DDT was applied by farmers.
3. Surveys to discover and to delimit infestations of the white-fringed beetle and the enforcement of quarantine procedures to prevent spread are continuing as a joint responsibility of the Bureau and the States concerned. With the exception of technical assistance and demonstrations of advanced methods of control, increasingly more responsibility is being placed on individuals, communities, and private agencies to control this insect at their own expense.

#### Hall Scale Eradication:

Continued progress has been made toward the eradication of Hall scale in California. A small, isolated infestation at Davis, California, appears to have been eliminated by a tree removal program carried on by cooperating State agencies, and a similar one at Oroville by tree removal and treatment. In spite of unfavorable weather conditions about 4,000 trees were fumigated during the 1950-51 treating period; 1,280 for the third and what is expected to be the last time. The remainder received their first or second fumigation. Because of unfavorable weather conditions about 2,000 infested trees were not treated. All trees that have had less than 3 fumigations are receiving the standard spray program for retardation of spread. The treatment program has now been completed on properties containing about 20,000 host plants, part of which were nursery trees.

The survey portion of the program to evaluate the treating work and further establish the area of infestation continues.

Gypsy and Brown-tail Moths:

1. Inspection and certification of products to prevent spread by artificial means: Regulated products valued at approximately \$53,992,000 were certified for movement from quarantined areas in eastern New York and New England to markets and consumers throughout the United States and Canada. Inspection and certification provided reasonable protection to uninfested sections of the country with minimum inconvenience and cost to the regulated public and industry.

Equipment for freight car and chamber fumigations was improved during the year, resulting in more effective and efficient fumigations. The electric generators which were formerly used, and the trucks on which they were mounted are no longer required for this operation and were disposed of as surplus equipment.

2. Control and survey operations. Pennsylvania State Gypsy Moth Quarantine No. 24 was revoked effective May 31, 1951. This action by the Commissioner of Agriculture culminated a successful cooperative eradication effort in an area comprising 450 square miles in eastern Pennsylvania. With the exception of limited survey activities to further verify the success of this operation and to quickly determine reentries, no further control work is contemplated there. This development together with the successful elimination of this insect in parts of eastern New York and southeastern Massachusetts, indicate the eventual possibility of complete control and has stimulated renewed State and local interest and participation.
3. A total of 179,824 acres were sprayed cooperatively with DDT by Federal, State and county agencies in the States of New York, Massachusetts, Vermont and Connecticut during the spring of 1951.

The 1951 spray season was the last in which the fleet of aircraft owned and operated by the Bureau will participate. Beginning in 1952, the bulk of the aerial spray program for control of the gypsy moth will be conducted by commercial spray firms under contract.

Grasshopper and Mormon Cricket Control:

1. It is estimated that more than 10 million acres have been treated in western states with chlordane, toxaphene, and aldrin to control grasshoppers since the current outbreak began in 1948. Organized, jointly financed work in outbreak areas on range lands has accounted for about half of this. The remainder has been done by individuals and groups of individuals at their own expense, except for assistance in surveys and advice as to where and when the work should be done to most effectively protect their crops.



2. In Crop Areas. Since farmers are now able, without Federal assistance, to buy and apply available insecticides to protect their planted crops against grasshopper damage, inventory of control materials and of bait processing and handling equipment has been greatly reduced. Much of the time formerly devoted to actual crop control work is now spent in the conduct of intensified surveys and in organizational and demonstrational work among farmers.
3. In Range Areas. Encouraged by research findings during the last two years, and particularly by the results obtained in a large scale range control operations conducted by the spraying of insecticide from aircraft in Arizona last summer, bait has been abandoned as a means for control of grasshoppers on range in nearly all cases. This program modification has resulted in the disposal of most of the loaders, spreaders, and mixers and of a substantial portion of the automotive vehicles. This year contracts were negotiated by the Bureau and cooperating agencies for the hauling of mixed insecticide, (formulated at refinery sites,), for the provision of tank storage facilities at airstrips and for aircraft.

#### General Surveys

1. General surveys during the year included the following:
  - a. Cooperative chinch bug surveys carried on with several states. Populations of chinch bugs have increased since 1949 in Arkansas, Illinois, Iowa and Kansas; they remained at about the same level in Indiana and Missouri; and decreased in Nebraska and Oklahoma.
  - b. Inspections for potato rot nematode in Washington and Oregon failed to detect any infestation for the second successive season.
  - c. Cooperative imported fire ant surveys have shown that this insect is present in Louisiana, Florida, Georgia, Arkansas, Texas, South Carolina and Tennessee in addition to Alabama and Mississippi where it was first found.
  - d. Citrus canker surveys during 1950 in Louisiana and Texas disclosed no infestations.
  - e. Cooperative cotton insect surveys were continued in most of the major cotton-growing states in 1951. These surveys helped farmers and insecticide suppliers to plan for insect control.
  - f. Screw-worm survey indicated cold weather in South during winter of 1950-51 restricted overwintering to southern half of Florida and a few counties in south Texas. Stockmen were encouraged to take advantage of this situation to prevent the usual rapid string and summer build-up.



- g. Fourteen eastern and north-central states cooperated in releasing European corn borer information weekly. Light overwintering, parasitism, and early spring weather all reduced first generation population. The survey permitted a most advantageous use of scarce insecticides.
- h. Cooperative pest surveys were also carried on for other crops including deciduous fruits, vegetables and tobacco.

## PLANT QUARANTINES

Current Activities: Measures are taken at mainland ports of entry and in Alaska, Hawaii, and Puerto Rico, to prevent introduction from abroad of insect pests and plant diseases detrimental to American agriculture. Plants and plant products for export are certified for compliance with sanitary requirements of other countries. Inspection of domestic plant materials in transit within the continental United States is performed to enforce regulations for preventing spread of injurious insects and plant diseases.

Cooperating agencies include: The Bureau of Customs; Immigration and Naturalization Service; Post Office Department; Public Health Service; and State, Territorial, and Insular plant quarantine services.

Among the undertakings now in process, the following are selected as typical:

1. Inspection of foreign air traffic. Planes from foreign countries are inspected to prevent the introduction of plant pests through air commerce.
2. Preflight inspection. Aircraft are inspected in Hawaii and Puerto Rico prior to departure for the mainland to detect the presence of prohibited or restricted plant material.
3. Inspection of surface traffic. Inspection of ship, train, vehicular and pedestrian traffic is conducted at the borders of the country, and at the major ports of entry.
4. Inspection at strategically located transportation centers to intercept shipments of commodities moving in apparent violation of Federal and State quarantines is conducted.

### Examples of Recent Progress and Trends:

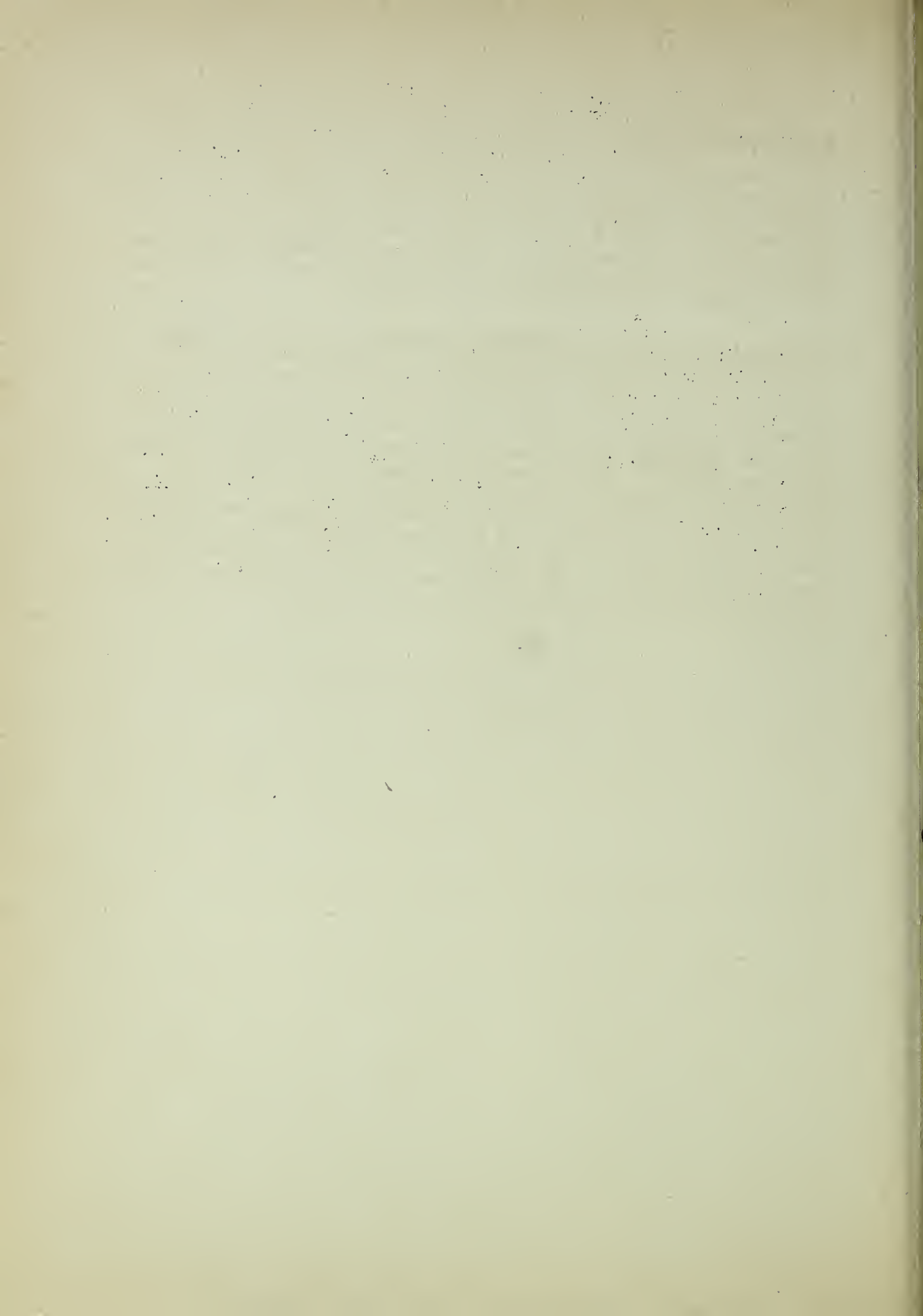
1. Foreign plant quarantine and transit inspection activities were merged July 1, 1951, permitting more efficient utilization of personnel and the strengthening of both activities. Inspection was made of 1,522,000 shipments of plant material moving through strategically located transportation centers during the fiscal year 1951 to determine compliance with domestic quarantine regulations. A total of 1,711 shipments was found to be moving in violation of federal domestic quarantines and state quarantines which this Bureau helps enforce; in addition 302 shipments were observed to be moving in apparent violation of state quarantine restrictions or certification requirements and were reported to the states concerned.
2. Foreign air traffic inspection heaviest on record. Foreign air traffic during the past year was the heaviest in the history of aviation, increasing 12 percent over 1950 which, in turn, had also been a record year. This brought about a corresponding increase

in the threat of introduction of foreign insect pests and plant diseases. Almost one-third of the 64,400 planes inspected were found to be carrying plant material not authorized entry because of pest risk. Many destructive insects and plant diseases were intercepted from this material, including potential pests of most of our major crops. Among them were the citrus blackfly, the Mediterranean, olive, West Indian, Mexican, and other species of fruit flies; the mango weevil, and the pink bollworm. A serious pest of grapes was intercepted from Europe and the golden nematode, citrus canker, and other serious diseases of citrus were also taken from material arriving on aircraft.

3. Threat to mainland from pests of Hawaii more than doubled. Inspection and clearance of aircraft in Hawaii prior to departure for the mainland has reached an all-time high. The 8,254 planes given preflight clearance represented an increase of 149 percent over the previous year. More than two-thirds of these planes would have carried unauthorized plant material, including hosts of the oriental, melon, and Mediterranean fruit flies, to the mainland had it not been removed prior to departure. Material infested with these and other pests was removed and adults of the oriental fruit fly were found in aircraft about to depart for the continental United States. To protect against the latter movement all aircraft, as in former years, were given two treatments with a DDT aerosol just before takeoff.
4. Record number of aircraft given preflight clearance in Puerto Rico. A new record was set in the preflight inspection of aircraft in Puerto Rico where 4,595 planes were cleared for departure for the mainland, an increase of 23 percent over 1950. Prohibited or restricted plant material was removed from nearly one-half of these planes.
5. Threat of introduction of citrus blackfly and other pests of Mexico growing. Vehicular travel from Mexico reached record heights during the past year. A total of 10,328,000 vehicles from Mexico were inspected at border ports of entry, an increase of 23 percent over 1950. This traffic is of special significance because of the northward migration of the citrus blackfly which was frequently intercepted. Many other serious pests were stopped at the border, including the Mexican and several other species of fruit flies, potato weevils, avocado weevils, and destructive pests of cotton, beans, tomatoes, and other important crops.
6. Ship inspection reaches new peak. During the past year 47,602 vessels arrived at United States ports. Because of depleted staffs and demands of other activities it was possible to inspect only 44,356 of them, those considered most likely to carry plant pests being given priority. Approximately one out of four carried prohibited or restricted plant material. Important pests were intercepted, including the giant African snail, the golden nematode, citrus canker, and other pests of fruits, vegetables, cereals, cotton, nursery stock, bulbs, seeds, forests, and ornamentals.



7. Receipts from fees. The number of railway cars from Mexico fumigated at the border to prevent the entry of pests by this means was reduced for the second consecutive year as a result of changed pest conditions in Mexico brought about by the Bureau's cooperative program in that country. During the fiscal year 1951 receipts in the amount of \$1,836 resulted from the fees charged for this fumigation (\$6 per car) and were deposited in the general fund of the Treasury. It is estimated that fees from this source will total approximately \$1,500 in the fiscal year 1952.
8. Serious foreign pests apprehended through postentry quarantine. The protection afforded against foreign pests by requiring that certain imported plants be grown for a period under quarantine conditions to determine whether they are infested or infected by forms not detectable at the time of entry was repeatedly demonstrated. Jasminum plants from the Philippines being grown in detention were found infested with an injurious white fly and a scale insect, neither of which are known to occur in the continental United States. Hops, flowering cherry, Daphne, and Laburnum were found to be infected with important virus diseases. During the year 600 shipments consisting of 1,447,662 units were imported for growth under postentry quarantine and 264,442 plants were released after having been kept under observation for the required period.



(b) Control of Emergency Outbreaks of Insects and Plant Diseases

Appropriation Act, 1952 .....	\$1,800,000
Anticipated pay adjustment supplemental .....	42,000
Activities transferred in the Budget Estimates to "Salaries and expenses, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration" .....	-842,000
Base for 1953 .....	1,000,000
Budget Estimate, 1953 .....	1,000,000
Change .....	- -

PROJECT STATEMENT

(Reflecting available funds)

Project	1951	1952 :(estimated):	1953 :(estimated):
1. Contingency fund .....	\$151,455:	\$1,000,000:	\$1,000,000
Unobligated balance .....	1,380,874:	- -:	- -
Total available .....	1,532,329:	1,000,000:	1,000,000
Transfer in 1953 Estimates to "Salaries and expenses, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration" .....	+1,013,431:	+842,000:	
Prior year balance available in 1951	-445,760:	- -:	
Anticipated pay adjustment supplemental .....	- -:	-42,000:	
Total appropriation or estimate	2,100,000:	1,800,000:	

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored, deleted matter enclosed with brackets):

- 1 For expenses necessary to carry out the provisions of the joint resolution approved May 9, 1938 (7 U.S.C. 148-148e), including
- 2 the operation and maintenance of airplanes [and the purchase of
- 3 not to exceed two, and surveys and], control operations in Canada in cooperation with the Canadian Government or local Canadian authorities, and the employment of Canadian citizens, [ \$1,800,000, of which ] \$1,000,000, which shall be apportioned for use pursuant to section 3679 of the Revised Statutes, as amended, for the purposes of said joint resolution only to the extent that the Secretary, with the approval of the Bureau of the Budget, finds necessary to meet emergency conditions.



The first change deletes the provision for the purchase of two airplanes. The planes purchased from these funds have been used in the regular control and eradication programs against grasshoppers and Mormon crickets. The authority proposed for deletion has been used in past years only in the event of mishaps or where planes have become obsolete to the point that necessary repairs were impracticable and uneconomical. The 1953 estimates propose to transfer these activities to the appropriation "Salaries and Expenses, Insect and Plant Disease Control" under which similar authority for the replacement of airplanes is proposed. Therefore, retention of the authority for the purchase of planes under this item is not necessary.

The second change is for the purpose of deleting reference to survey operations since the proposed transfer in the 1953 estimates would transfer these survey operations to the item "Salaries and expenses, insect and plant disease control."

The third change is necessary to make the full amount of the appropriation requested subject to apportionment in accordance with section 3679 of the Revised Statutes, as amended, to the extent that the Secretary, with the approval of the Bureau of the Budget, finds necessary to meet emergency conditions.

## STATUS OF PROGRAM

Current Activities: Programs are conducted to combat emergency outbreaks of insects and plant diseases. Funds are available only to the extent that the Secretary, with the approval of the Bureau of the Budget, and the concurrence of both Appropriation Committees finds it necessary to meet emergency conditions.

### Fiscal year 1951 programs:

Surveys in the fall of 1950 indicated that approximately 800,000 acres of land in Wyoming, unless treatment was applied, might become a source of reinfestation for areas already under control. An amount of \$302,000 was requested and approved for release from the contingency fund in May of 1951 to take care of this emergency. The intensive pre-treatment surveys were begun in early June and within the areas totalling 800,000 acres, where threatening to severe populations of grasshoppers were expected, 450,000 acres were marked for attention. In cooperation with the State of Wyoming, control work on these areas was completed at a cost of \$151,455 to the Federal Government which was somewhat less than 50% of the total cost of the program. The remainder of this allocation was not used. This activity successfully controlled the threatened outbreak.

### Fiscal year 1952 programs:

Surveys completed in the spring of 1951 indicated that control activities would be needed in September 1951 in Arizona if rainfall during the summer was adequate to permit a normal hatch of grasshopper eggs in the ground. An amount of \$41,000 was requested and approved by both Appropriation Committees for release from the contingency fund to take care of this pending emergency. However, unusually dry weather acted as a natural control in this instance, and the use of these funds was unnecessary. Therefore, as of January 1, 1952, it has not been necessary to use any part of the 1952 contingency fund.

Surveys in the fall of 1951 indicated that emergency control programs may be needed in some of the western states this year, which will require withdrawals from this fund. Further surveys in the spring will be necessary before definite determinations can be made.

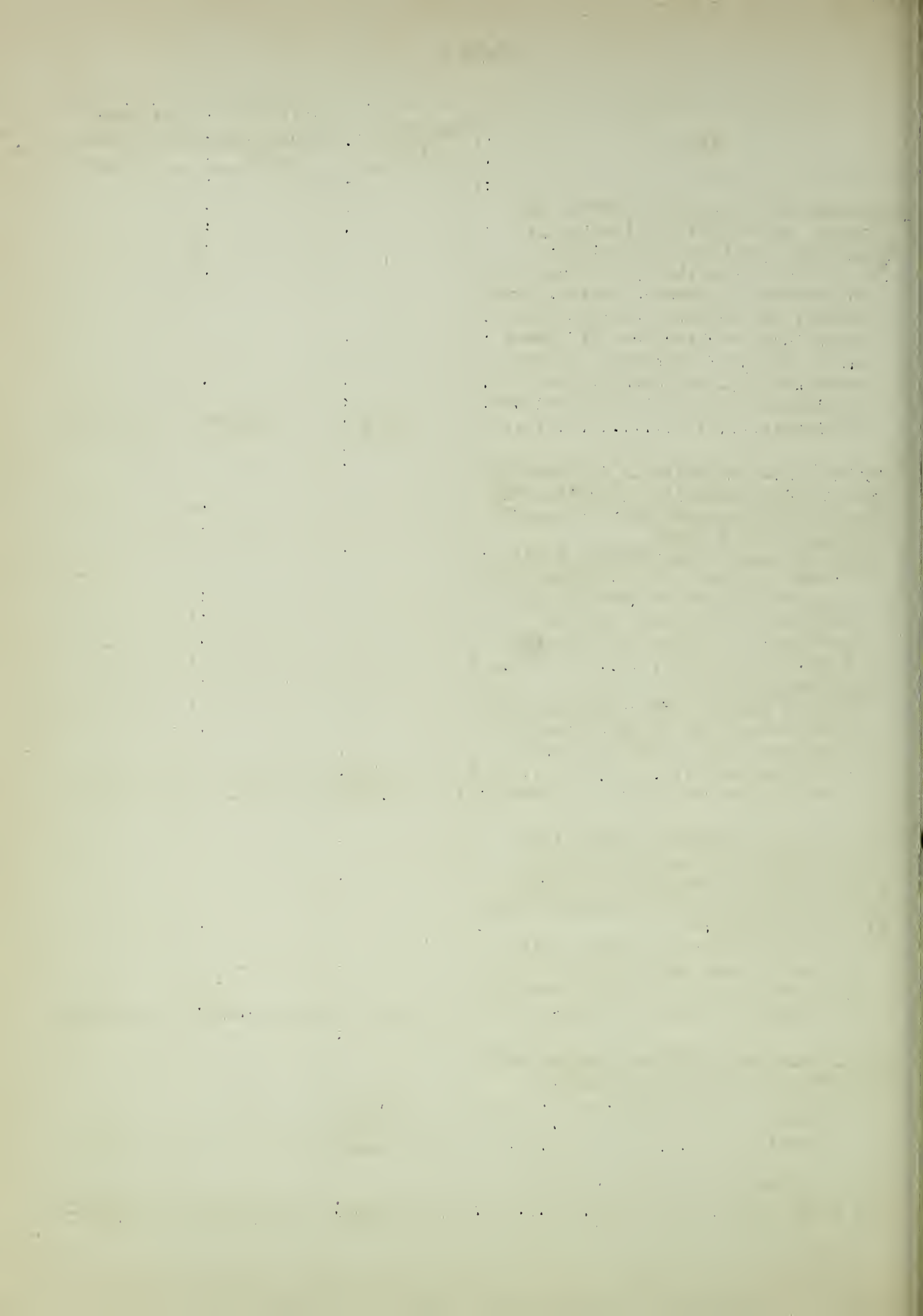
STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Agricultural Marketing Act (RMA--Title</u>			
<u>II), Agriculture (Bureau of Entomol-</u>			
<u>ogy and Plant Quarantine):</u>			
Marketing research and service ....	\$94,486:	\$83,000:	\$118,000
<u>Control of Forest Pests, Agriculture</u>			
<u>(Bureau of Entomology and Plant</u>			
<u>Quarantine):</u>			
Forest Pest Control Act .....	330,946:	341,500:	323,500
White Pine Blister Rust:			
Leadership, coordination, and			
technical direction of white pine			
blister rust control .....	718,185:	682,000:	682,000
Blister rust quarantine enforcement:	15,324:	- -	- -
Cooperative blister rust control			
on State- and privately-owned			
lands .....	352,889:	363,000:	600,000
Total, Control of Forest Pests.	1,417,344:	1,386,500:	1,605,500
<u>Working Funds, Agriculture, Agricul-</u>			
<u>tural Research Administration (Bureau</u>			
<u>of Entomology and Plant Quarantine)</u>			
<u>Advanced from:</u>			
<u>Department of the Army:</u>			
For investigations and the develop-			
ment of control measures on insects			
and other arthropods of importance:			
to the Department of Defense ....	281,849:	661,582:	- -
<u>Housing and Home Finance Agency:</u>			
For termite experience investiga-			
tions in the Gulf States .....	70:	1,036:	- -
<u>Forest Service, Department of Agri-</u>			
<u>culture:</u>			
White pine blister rust control .	39,900:	8:	- -
<u>Department of the Navy:</u>			
For investigations and the develop-			
ment of control measures on in-			
sects and other arthropods of			
importance to the Department of			
Defense .....	24,622:	16,039:	- -
To cover expenses of providing			
technical assistance to the Depart-			
ment of the Navy on quarantine			
and insect control problems in			
Guam and the Pacific Mandated			
Islands .....	7,354:	- -	- -
Total, Working Funds .....	353,795:	678,665:	- -

(Continued on next page)



Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
Miscellaneous Contributed Funds, Department of Agriculture (Bureau of Entomology and Plant Quarantine):			
Trust funds deposited by cooperators for cooperative work on blister rust control and barberry eradication, inspection and clearance of flower bulbs from the Netherlands to the United States, and cooperative experiments in insecticidal residue in animals .....	236,193:	222,000:	222,000
Working Fund, Agriculture, Agricultural Research Administration, (Trust Fund) (Bureau of Entomology and Plant Quarantine) Advanced from:			
Trust Territory Conservation Fund:			
To cover expenses of providing technical assistance on agricultural quarantine and insect control problems that affect the Pacific Mandated Islands .....	6,822:	- -	- -
Government of Guam:			
To cover expenses of providing technical assistance on agricultural quarantine and insect problems affecting Guam .....	3,480:	- -	- -
Total, Working Fund (Trust Fund)	10,302:	- -	- -
United States Dollars Advanced from Foreign Governments, United States Information and Educational Program (Trust Fund)(Bureau of Entomology and Plant Quarantine):			
To perform quarantine services in connection with preventing the introduction of the Oriental fruit-fly into Australia and New Zealand ....	- -	4,932:	5,568
Obligations under reimbursements from Governmental and other agencies:			
1. Salaries and expenses .....	23,150:	- -	- -
2. Control of forest pests .....	4,653:	- -	- -
Total .....	27,803:	- -	- -
TOTAL, OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS .....	2,139,923:	2,875,097:	2,451,068



## PASSENGER MOTOR VEHICLES AND AIRCRAFT

### Passenger Vehicles

The request for 22 replacements is in line with the Bureau's program to replace each year those cars which are old and hazardous or uneconomical to operate. During the fiscal year 1951, the Bureau replaced 34 passenger-carrying cars and 22 cars are planned for replacement in 1952. The 22 vehicles proposed for replacement in 1953 represent approximately 7 percent of the passenger vehicles operated. The cars to be replaced will be of 1944 or earlier models, or will have mileage in excess of 60,000 miles at the time of trade-in.

Replacements are needed since adequate transportation facilities are necessary to the efficient conduct of the Bureau's work. Many of the cars are used to reach numerous points where no public transportation is available, and where rough country roads subject the cars to hard usage.

### Airplanes

Two airplane replacements are requested for investigating and demonstrating the use of special equipment in the suppression of destructive insects attacking crops and forested areas.

It is estimated that the Bureau will require in 1953 the same number of planes as are now being operated. As planes rapidly become obsolete and uneconomical to repair, and are subject to many mishaps, replacement authority is requested for two of the 10 planes being operated in connection with the program. However, replacements will be made only in the event it is not found practicable and economically feasible to make necessary repairs and retain the present equipment.





## CONTROL OF FOREST PESTS

### Purpose Statement

For the protection and preservation of forest resources of the United States, it is necessary to suppress and if possible eliminate destructive insect pests and diseases that threaten timber areas. Programs conducted under this appropriation are authorized by the Forest Pest Control Act (16 U.S.C. Sup. 1, 594), the Lea Act (16 U.S.C. 594a), and the Plant Quarantine Act of 1912, as amended (7 U.S.C. 151-167). Activities include two types of work:

1. Control operations to suppress or eradicate forest insect pests and diseases, including the white pine blister rust.
2. Surveys on forest lands to detect and appraise infestations of forest insect pests and tree diseases, and in cooperation with research units to recommend protective measures.

The control programs are carried on jointly by Federal, State, and private agencies under the technical direction and leadership of the Bureau of Entomology and Plant Quarantine. The cooperating Federal agencies include the Bureau of Entomology and Plant Quarantine and the Forest Service of the Department of Agriculture and the National Park Service, Office of Land Utilization, Bureau of Land Management, and Bureau of Indian Affairs of the Department of the Interior. Survey work is primarily the responsibility of the Bureau of Entomology and Plant Quarantine.

The programs are administered by existing field offices maintained by the several cooperating agencies in the affected forest regions. The personnel engaged in this work have been included in the statements of the cooperating agencies which appear elsewhere.

	Estimated, 1952	Budget Estimate, 1953
Appropriated funds	\$6,000,000	\$8,000,000

# CONTROL OF FOREST PESTS

	Forest Pest Control Act	White Pine Blister Rust	Total
Appropriation Act, 1952 and base for 1953 .....	\$2,700,000	\$3,300,000	\$6,000,000
Budget Estimate, 1953 .....	4,000,000	4,000,000	8,000,000
Increase .....	<u>+1,300,000</u>	<u>+700,000</u>	<u>+2,000,000</u>

## SUMMARY OF INCREASES, 1953

### Forest Pest Control Act:

For expansion of detection and appraisal surveys .....	+\$148,000
For control of epidemics of spruce bark beetle in Colorado; spruce budworm in Idaho, Oregon and Montana; Bark beetles in Idaho, Montana, Wyoming, Colorado, New Mexico, California, and Mississippi; and smaller projects involving other insects and diseases .....	<u>+1,152,000</u>
Subtotal .....	<u>+1,300,000</u>

### White Pine Blister Rust:

Increase to expand control operations in the Northwest on State and private lands adjacent to or intermingled with Federal land, and on lands under the jurisdiction of the Forest Service .....	<u>+700,000</u>
Total .....	<u>+2,000,000</u>

## PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase	1953 (estimated)
1. Forest Pest Control Act::				
a. Detection and appraisal surveys .....	\$273,903	\$281,000	\$148,000(1)	\$429,000
b. Operations to control destructive forest pests on lands ir- respective of ownership	3,355,062	1,919,000	+1,152,000(2)	3,071,000
c. Contingency fund ....	- -	500,000	- -	500,000
Subtotal .....	<u>3,628,965</u>	<u>2,700,000</u>	<u>1,300,000</u>	<u>4,000,000</u>
2. White Pine Blister Rust::				
a. Leadership, coordina- tion, and technical direction of white pine: blister control (Ento- mology and Plant Quarantine) .....	718,185	682,000	- -	682,000

(Continued on next page)



Project	1951	1952 :(estimated):	Increase	1953 :(estimated)
.b. Blister rust quaran- tine enforcement (Ent. and Plant Quarantine)	\$15,324:	- -:	- -	- -
c. Blister rust control operations on the national forests (Forest Service) .....	1,773,907:	1,750,000:	+463,000(3):	2,213,000
d. Blister rust control on lands under juris- diction of Interior Department (Department of the Interior) .....	515,365:	505,000:	- -	505,000
e. Cooperative blister rust control on State and privately owned lands (Entomology and Plant Quarantine) ....	352,889:	363,000:	+237,000(3):	600,000
Subtotal .....	3,375,670:	3,300,000:	+700,000	4,000,000
Unobligated balance .....	156,003:	- -:	- -	- -
Total pay adjustment costs:	[- -]:	[168,000]:	[+53,600]	[221,600]
Total available or estimate:	7,160,638:	6,000,000:	+2,000,000	8,000,000
Transferred in 1952 Esti- mates to:	:	:	:	:
"Salaries and Expenses, Office of Informa- tion, Department of Agriculture" .....	+250:	- -:	:	:
"Salaries and Expenses, Entomology and Plant Quarantine, Agricul- tural Research Admin- istration" .....	+557,821:	- -:	:	:
1950 appropriation available in 1951 ..	-2,079,459:	- -:	:	:
Reduction pursuant to Sec. 1214 .....	+60,750:	- -:	:	:
Total appropriation or estimate .....	5,700,000:	6,000,000:	:	:

#### INCREASES AND DECREASES

##### Forest Pest Control Act:

(1) An increase of \$148,000 is proposed under the project "Detection and appraisal surveys."

Need for Increase: Early detection of infestations in their incipency, and prompt action to suppress those of potential importance contribute to reduction of control costs. All of the agencies concerned with forest pest control agree that there is urgent need to strengthen the survey activities and that this should be done as rapidly as possible.

Based on the best opinions of entomologists and foresters, forest insects and diseases are killing large quantities of timber in the Southeast, the Southwest, and in Alaska. For example, it is estimated that losses from bark beetles alone accounted for 216,000,000 board feet of timber during 1951 in the South. In Alaska a recent outbreak of the Sitka spruce beetle killed 35,000,000 board feet of Sitka spruce that had been reserved for future military use, and currently an outbreak of the blackheaded budworm threatens the future of the recently developed pulp and paper industry of the territory.

Plan of Work: The increase proposed would aid in carrying out detection and appraisal surveys in a more adequate manner. In the Bureau of Entomology and Plant Quarantine plans are (1) to increase the personnel in the extensive southeastern states area to correct insufficient survey coverage in the southern pine and hardwood forests, (2) to provide necessary surveys in the highly important commercial forests and recreational parks of the Southwest -- work to be centered at Albuquerque, New Mexico, and (3) to establish detection and appraisal surveys in the valuable timbered tracts of Alaska, some of which are known to be suffering heavy losses -- this activity to be centered at a location where other forest activities are carried on, such as at Juneau. The increase contemplated in this Bureau amounts to \$84,000 over the \$239,500 planned expenditure for this purpose in fiscal year 1952.

In the Bureau of Plant Industry, Soils, and Agricultural Engineering plans are to (1) initiate surveys for fungus diseases of Sitka spruce and other standing timber in Alaska as a basis for control measures; (2) increase surveys in Oak Wilt; (3) undertake technical advice and control surveys on mistletoe in the Southwest; (4) initiate surveys on occurrence and spread of the European Larch Canker in Massachusetts; (5) initiate surveys on root rots of conifers in the Northwest; and (6) initiate surveys on beech-scale and nectria canker in the Northeast. The total increase contemplated in this Bureau amounts to \$64,000 over the \$41,500 planned expenditure for this purpose in fiscal year 1952.

(2) An increase of \$1,152,000 is proposed under the project "Operations to control destructive forest pests on lands irrespective of ownership."

Need for Increase: An increase of \$1,152,000 is proposed for combatting insect infestations of forest pests during the fiscal year 1953. Information now available clearly points to the need for vigorously continuing control of the Engelmann spruce bark beetle in Colorado. It is anticipated that \$1,670,000 would be required for that purpose, the major portion of which will be needed for control work during the summer of 1952. In addition there are several outbreaks which should be combatted to protect valuable timber resources almost entirely on Federally owned lands. The field work on these programs would be undertaken primarily in the spring of 1953. The estimated costs of these control programs are listed below:

<u>Item</u>	<u>Estimated Obligations, 1952</u>	<u>Estimated Costs, 1953</u>
Engelmann Spruce Bark beetle on national forests in Colorado .....	\$900,000	\$1,670,000



It is estimated that of the total needs \$1.6 million will be expended in the summer of 1952 on major field operations and the remaining \$70,000 will be used in the late spring of 1953 for reactivating control operations. Continued and aggressive control efforts during fiscal year 1953 are highly essential to assure successfully breaking the back of this virulent epidemic, already reduced beyond expectations as a result of past effective control efforts and favorable biological factors. Destruction of the Engelmann spruce in these high mountain areas will adversely affect watershed conditions in an area where available water is intensively used for irrigation purposes. The continued destruction of the Engelmann spruce by the beetles would also adversely affect the recreation and the timber industry in this region. Remarkably satisfactory progress has been made to combat the infestation and well-established and proven control procedures are employed. Although weather extremes in the winter of 1950-51 resulted in vast numbers of insects being killed by freezing there remained a large insect population of continuing epidemic proportions. 200,000 trees were treated in the late summer of 1951 during the brief period field operations were possible, and this work further helped to reduce insect populations. The effect of the 1952 control program will be to drastically reduce the epidemic potential. Although estimates beyond 1953 are highly speculative, by the very nature of the insect behavior, best estimates available at this time indicate 65,000 trees will require treatment over the next three years at a cost of approximately \$390,000. This very favorable outlook is the result of a combination of effective control measures strategically applied, natural predators working extensively on the insects, and weather conditions adverse to the insects' existence.

Presently available information from surveys compiled and analyzed indicates 400,000 trees to be treated in the fiscal year 1953 at a cost of \$4.50 per tree. With a reduction in the size of the program, unit costs have increased from \$2.26 per tree due to the reduced numbers of trees in each of the more scattered epidemic areas.



<u>Item</u>	<u>Estimated Obligations, 1952</u>	<u>Estimated Costs, 1953</u>
Mountain pine beetle on white pine in national forests in northern Idaho .....	- -	\$300,000

There has been a marked increase in the severity and number of mountain pine beetle attacks in mature stands of white pine in northern Idaho national forests. Stumpage values at stake are high, frequent sales of national forest stumpage bringing \$35-\$55 per thousand board feet. An estimated 20 million board feet of infested and blowdown trees valued at \$700,000 have been salvaged in these areas from national forest lands. Well over one billion board feet of timber conservatively valued at more than \$35 million are threatened. It is estimated there are on national forest lands 15,000 trees in the epidemic areas of north Idaho. Treatment to control the insect will cost \$20 per tree. The high cost per tree is occasioned by the fact that due to the excessive height of the trees to be treated, each will have to be felled, bucked into logs, and rolled in order to make possible the proper application of the insecticide.

Spruce budworm on Douglas-fir and white fir in the Flathead, Lolo, Helena, Deerlodge, and Gallatin National Forests, Montana ....	- -	221,900
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Although spruce budworm infestations are widespread in the Northern Rocky Mountain area an alarming increase of the budworm infestation has taken place on these five national forests. Considerable mortality is occurring in Douglas-fir stands. This species has become increasingly valuable and on the national forests stumpage values are averaging \$4-\$10 per M board feet. It is estimated 148,000 acres are heavily infested and should be treated by aerial spraying. Additional areas are under observation and may require treatment in future years. Cost is estimated at \$1.50 per acre, somewhat higher than normally because of more scattered location of areas to be treated.

Item	Estimated Obligations, 1952	Estimated Costs, 1953
Douglas-fir beetle on Douglas-fir on national forest lands in northern Idaho	- -	\$50,000

More timber is being killed by this insect within the Northern Rocky Mountain area than from any other forest insect. As the Douglas-fir timber has become increasingly important in the timber economy of the region, these losses have become increasingly intolerable. It is planned to undertake control measures in an area where losses are greatest. It is estimated 4,000 trees will require treatment at a cost of \$12.50 per tree, a somewhat higher cost per tree than usual, due to the fact that a large number, because of their excessive height, will have to be felled in order to be treated. It is expected that other areas affected by the Douglas-fir beetle will require treatment as major epidemic proportions are attained and economic losses increase.

Mountain pine beetle on lodgepole pine in the Kootenai and Cabinet National Forests, Montana .....	\$36,000	85,000
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Infestation of mountain pine beetle in the Kootenai and Cabinet National Forests, on Federal, state, and private lands which threatens destruction of an extensive area of lodgepole pine, is now being combatted. Major financial contributions are expected from state and private land owners. The amount indicated is for necessary follow-up work and in the spring of 1953 should place this outbreak on a maintenance basis thereafter. Cost per tree will be high due to necessity for felling or bucking a large proportion of the trees. Approximately 14,450 infested trees which cannot be removed through logging operations will require treatment at a cost of \$11.00 per tree, or a total of \$158,900. Of this total, \$36,000 Federal funds from the 1952 appropriation plus an anticipated \$21,000 state and private contribution will be expended prior to July 1, 1952. The remaining \$107,900, to be expended in F.Y. 1953,

Item	Estimated Obligations, 1952	Estimated Costs, 1953
<p>will be composed of an anticipated state and private contribution of \$22,900 and \$85,000 federal funds. The total state and private contribution on the project will thereby be \$43,900. The timber being protected, particularly in the Kootenai National Forest is being used in markedly increasing quantities for lumber. Also the permanence and stability of an established pole-treating industry is dependent on the preservation of this timber.</p>		
<p>Black Hills beetle on ponderosa pine in the Rio Grande, San Isobel, San Juan, and Uncompahgre National Forests, Colorado ..</p>	\$10,000	\$36,000
<p>The infestation of Black Hills beetle on ponderosa pine in the four national forests in Colorado has assumed threatening proportions which may grow into major epidemics. Threatened is the prime commercial timber specie on these national forests. Loss of this timber would adversely affect watershed values. An estimated 6,000 trees will require treatment at a cost of \$6 per tree.</p>		
<p>Great Basin tent caterpillar on aspen in the Santa Fe and Carson National Forests, New Mexico .....</p>	10,000	10,000
<p>This insect has multiplied to such proportions that it is completely defoliating Aspen stands along streams and dead caterpillars accumulating in streams have fouled these waters to such an extent that such areas are offensive to human use. Recreation activities in this highly developed resort country in the vicinity of Taos and Santa Fe have been adversely affected. Approximately 6,600 acres will require treatment at a cost of approximately \$1.50 per acre.</p>		
<p>Western pine beetle on ponderosa pine in vicinity of Deadwood Reservoir, Boise National Forest, Idaho .....</p>	34,100	15,000
<p>This operation is considered the concluding phase of control activities initiated in the spring of 1951. It is expected this</p>		



<u>Item</u>	<u>Estimated Obligations, 1952</u>	<u>Estimated Costs, 1953</u>
insect outbreak can be placed on a maintenance basis after fiscal year 1953. 1,000 trees will require treatment at a cost of \$15 per tree.		
Western pine beetle on ponderosa pine in northern California National Forests ....	\$30,000	\$50,000
Heavy insect populations continue in the ponderosa pine stands of northern California. In the national forests are found the highest quality ponderosa pine in the Nation, and comprise in the neighborhood of 100 billion board feet with current stumpage value of \$30 per thousand board feet. Full survey data are not presently available, and detailed estimates cannot now be prepared for the entire infestation. However, the amount indicated is for control in the epidemic areas.		
Western pine beetle on pines in southern California .....	20,000	25,000
Infestations of western pine beetle continue in epidemic proportions in southern California a section of the state where timber cover is very limited and possesses higher recreation value in a densely populated area. The amount indicated is based on best information available at present time, surveys being incomplete.		
Spittlebug and sawflies on pine plantations of National Forests in Michigan and Wisconsin .....	19,600	25,000
Infestations of spittlebugs and sawflies continue to occur in and destroy plantations in the national forests in Michigan and Wisconsin. Well established control methods are used in a very effective manner. The plantations are becoming increasingly valuable with increase in age, and control measures are warranted. Although complete survey returns are not presently available it appears that \$25,000 will be needed to suppress these insects in fiscal year 1953.		

<u>Item</u>	<u>Estimated Obligations, 1952</u>	<u>Estimated Costs, 1953</u>
Spruce budworm on Douglas-fir and white fir in Oregon and Washington .....	\$700,000	\$400,000
<p>This is the concluding phase of a control project which has been carried on during the past three years. Primarily, national forest lands are to be treated by aerial spraying of DDT. Substantial State and private contributions (75%) will be made for control expenditures on State and private lands. Timber of great importance in the leading timber producing region of the country is threatened.</p>		
Mistletoe on pines in the Mexcallero Indian Reservation, New Mexico, the Bryce Canyon National Park, Utah, and the Grand Canyon National Park, Arizona .....	12,050	29,400
<p>Heavy losses are being sustained in commercial ponderosa pine stands from mistletoe disease. In addition to logging on the Mescalero Indian Reservation mistletoe control is needed in the sapling and pole stands which are infected over some 200,000 acres. A ten-year control program on this Reservation is forecast. Completion of the initial control of mistletoe infecting ponderosa pine on the South Rim of the Grand Canyon National Park in Arizona to protect recreation values is planned. Initiation of the control of mistletoe infecting ponderosa, limber, and bristlecone pines in the Bryce Canyon National Park in Utah to protect recreation values is also desirable. A four-year control program is contemplated in Bryce Canyon.</p>		
Miscellaneous small projects on land under control of the Department of Interior in several States .....	42,950	67,700

There are twenty control projects ranging from \$700 to \$15,000 in control costs which are very important from the standpoint of reducing insect and pest infestations which are attaining epidemic proportions. These control projects are located on Federal lands on National Parks, National Monuments, National Wildlife refuges, and Indian Reservations in sixteen different states.

<u>Item</u>	<u>Estimated Obligations, 1952</u>	<u>Estimated Costs, 1953</u>
Miscellaneous small projects on land under control of the Forest Service in several States .....	\$104,300	\$86,000

There are twelve control projects which, although individually small, are considered very important from the standpoint of reducing insect infestations which have attained threatening proportions. Failure to do control work on these insect outbreaks while they are small will result in the necessity for greater control expenditures in the future. These control projects are located on national forest lands in the states of California, Idaho, Minnesota, Nebraska, Nevada, New Mexico, South Dakota, Utah, Vermont, and Wyoming.

Subtotal, control projects .....	1,919,000	3,071,000
Contingency fund .....	500,000	500,000
Detection and appraisal surveys .....	281,000	429,000
Total .....	2,700,000	4,000,000

#### White Pine Blister Rust

(3) An increase of \$700,000 to expand control operations in the Northwest on National Forest lands and on state and private lands adjacent to or intermingled with Federal lands.

Need for Increase: Within the Inland Empire white pine area there are 1,588,000 acres of white pine that economically justify protection from blister rust. Control work is being carried out on 938,000 of these acres. The proposed increase will permit initiating control on about one-half of the remaining 650,000 acres, while keeping rework up to date on areas that have already received initial protection. When protected from blister rust, this 650,000 acres would eventually yield about 16 billion board feet of lumber which at the current price of \$28 per thousand board feet would amount to \$448,000,000. Damage to both reproduction and mature trees is becoming increasingly evident in all unprotected areas, with losses already reaching 28% of the stand in some localities.

Importance of Western White Pine: This country is in need of all the white pine lumber it can produce. Western white pine is the key timber tree in the Inland Empire. None of the other trees in the same territory begins to equal it for qualities of soft, even textured wood so highly sought



after for specialized purposes. White pine produces a greater volume of wood per acre than other trees growing in the same area. It brings higher prices, and is the mainstay of the lumber and related industries of many communities. Of the 3 million acres in the region supporting mature and young white pine growth with an estimated present and future stumpage value of over 870 million dollars only about 1/2 or 1,588,000 acres of the better timber growing sites have been selected for protection. However, under intensive management, and if protected from rust, these areas are expected to produce a much greater volume per acre than in the past, thus helping to keep production in line with future demands.

Status of Work: White pine producing lands in the Inland Empire now comprise about 3 million acres. From within these areas high priority sites totaling 1,588,000 acres have been selected for protection from blister rust. The disease is under control on 625,000 acres and the initial work has been done on an additional 313,000 acres. 650,000 acres have received no attention to date and it is in these areas that damage is increasing rapidly. Only in protected areas is it possible to manage the forests in such a way as to insure future crops of white pine.

Cooperation of State and Private Agencies. Nearly all state and privately owned white pine in control areas of the Inland Empire is located in Idaho. For twenty-three years, except for a few during the worst part of the depression, the State of Idaho and timber protective associations active in the area have provided money for cooperative control work on these lands. For the current fiscal year these agencies will provide \$51,525 as compared with \$103,000 provided by the Federal Government. Approximately 70 percent of the land in Idaho is federally owned. White pine produced in northern Idaho helps support many industries outside the State. The initial cost of protecting white pine reproduction is high. Except for the larger timber owners participating through associations, no way has been found to place any responsibility on the individual land owners. Idaho is aware of the urgency associated with completing initial control of unprotected areas and is continuing efforts to increase from one source or another local participation in control work.

Plan of Work: The Bureau of Entomology and Plant Quarantine has been given the responsibility for cooperation with state and private agencies in the application of control measures on state and private lands and for the over-all planning, coordination and technical direction of the work on lands of all ownerships. The Forest Service is responsible for the application of control measures on National Forest lands. The work will follow the present plan of cooperative attack on the problem. Advantage is taken of improved eradication and management methods, including the use of chemicals for destroying ribes occurring in concentrations and in cutover areas. Where practicable and to the advantage of the government, ribes eradication is contracted to individuals. Less expensive ways of removing and suppressing ribes are persistently sought and changes in work methods, equipment and field operations are put into practice when demonstrated to be better than those in current use.

## STATUS OF PROGRAM

### FOREST PEST CONTROL ACT

Current Activities. This program is conducted under the Forest Pest Control Act, approved June 25, 1947, which established a national policy to protect and preserve forest resources of the United States from destructive insect pests and diseases, thereby enhancing the growth and maintenance of forests, promote stability of forest-using industries, aid in forest fire control, conserve forest cover on watersheds, and protect recreational and other values of forests.

The Bureau of Entomology and Plant Quarantine is responsible for detection and appraisal surveys on forest insects, as well as for leadership in cooperative control programs conducted on State and privately owned lands. The Bureau of Plant Industry, Soils, and Agricultural Engineering is responsible for detection and appraisal surveys on forest tree diseases. The Forest Service conducts control activities on lands under its jurisdiction. The various units of the Department of the Interior are responsible for control activities conducted on lands under their jurisdiction.

### Examples of Recent Activities

- a. Detection and Appraisal Surveys. Surveys were carried out during the 1950 season on a more extensive scale and with more complete coverage than heretofore. Better sampling methods and research on ground and aerial surveys have brought forth improved techniques and their application has resulted in more accurate estimates of damage and populations. In addition to more detailed attention to already known serious infestations, numerous areas of small acreage were revealed by these surveys. Treatment of these areas was recommended so as to control the infestations and prevent further losses.
  - (1) During 1950 further emphasis was placed on cooperation with all agencies concerned with forest protection in order to get more complete information on forest insect conditions throughout the country. The most striking example, as in 1949, was the Oregon-Washington spruce budworm survey. This survey, under the direction of the Bureau of Entomology and Plant Quarantine, was carried out by the federal and state forest services and other cooperating agencies. It led to a very complete appraisal of the situation and the development of plans for a control program in 1951. Other examples of cooperative surveys were those being developed in the Northeast and the Lake States.
  - (2) Closely coordinated surveys in the spruce budworm-infested stands in northern Maine indicated that populations were still too low to cause appreciable tree injury and necessitate control operations. Detailed surveys of the Engelmann spruce beetle situation on the White River, Routt, and Arapaho National Forests in Colorado indicated a spread of heavier infestations over a larger area than were reported previously.



- (3) Advances have been made in delineating the extent of forest insect infestations by aerial surveys and aerial photography. State-wide surveys in Oregon and Washington, covering 49,000,000 acres, enabled observers to map important bark beetle infestations as well as the extent of the budworm defoliation. In Maine 10 million acres in the spruce fir region were surveyed during a 2-1/2 week period and 4-1/2 million acres of light spruce budworm defoliation were mapped. Aerial surveys of bark beetle infestations, covering large areas, were also carried out in Texas and California. The Marine Corps, at the Peterfield Point Air Base, Jacksonville, N. C., cooperated in an aerial survey of the southern pine beetle infestation on the Croatan National Forest adjacent to the Base. Preliminary work with color film in aerial photography of plantations in New York showed that it was possible to determine extent of infestation over relatively large areas.
- b. Control Activities. Major control efforts were directed against Engelmann spruce beetle in Colorado, and the spruce budworm in Washington and Oregon. Numerous smaller control projects, but still of major significance, were also carried on.

- (1) In the summer of 1950 a bark beetle control program was initiated against the Engelmann spruce bark beetle on the White River, Routt, and Arapaho National Forests, Colorado. A total of 784,082 insect infested Engelmann spruce were treated with slightly over a million gallons of insecticide mix at an average cost of \$2.26 per tree. Operational phases of the work were under direction of the Forest Service and technical phases of the operations plus surveys were directed by the Bureau of Entomology and Plant Quarantine. Field operations started in June and ceased in October with the advent of adverse weather.

In 1951 treating started about September 1 and was stopped on October 27 by adverse weather conditions. 199,000 trees were treated and in addition 2,722 trap trees were felled. Because of the shorter treating season and the lighter concentration of trees in the areas treated, the cost per treated tree was \$3.46. Approximately \$2,800,000 has been expended to date on this project. Because of control work performed to date and the destruction of beetles during the severe winter of 1950-51, it is now estimated that the epidemic can be controlled within a much shorter period of time and at less cost than was originally contemplated.

- (2) Control of the spruce budworm in the Oregon-Washington area was continued by means of aerial spraying with DDT, 940,000 acres of Federal, State, and private lands being treated in the spring and summer of 1951. This was again a cooperative program engaging several Federal and State agencies with substantial financial contributions being made by the States and



the private land owners. The Forest Service was responsible for administration of the control program on Federally owned lands (including small areas controlled by the Department of Interior) and all operations in the State of Washington, and the State Forester of Oregon being responsible for control activities on State and privately owned lands in Oregon. Control work was fully as effective on the 940,000 acres treated in 1951 as in 1950 when 950,000 acres were treated and in 1949 when 266,000 acres were treated, by the same methods and with a similar organization structure.

- (3) The bark beetle infestation on lodgepole pine in the Targhee-Teton National Forest and the Grand Teton National Park was brought to a concluding stage as a result of control efforts carried on during the past four field seasons. Hereafter, control work should be of maintenance proportions.
- (4) The bark beetle infestation in the Harney and Black Hills National Forests of South Dakota was in the "mop-up" stage in the fall of 1950 and spring of 1951 and is now considered to be on a maintenance basis.
- (5) Chemical treatment of infested trees to control serious bark beetle infestations was carried out in 1951 against the Black Hills beetle in ponderosa pine in the Dixie National Forest, Utah; the western pine beetle in ponderosa pine in the Deadwood area, Boise National Forest, Idaho; and the mountain pine beetle in lodgepole on the Kootenai and Cabinet National Forests, Montana.
- (6) The Forest Service and the Department of Interior also carried on control activities on numerous small projects. These small programs followed cooperative reviews by the land managing agencies and the Bureau of Entomology and Plant Quarantine.

### WHITE PINE BLISTER RUST

Current Activities. The purpose of this work is to control the destructive, introduced, blister rust disease of white pines which destroys one of our most valued forest resources.

Under the authorizing legislation and agreements with cooperating agencies, the Bureau of Entomology and Plant Quarantine is responsible for leadership, coordination, and technical direction of the overall phases of the work for all the participating agencies and, in addition, for cooperative control work on state and private lands. The Forest Service is responsible for control work on National Forest lands; and the Department of the Interior for control work on National Park, Indian, public domain and Oregon and California Revested lands. In carrying out its overall responsibilities, the Bureau of Entomology and Plant Quarantine:

- (a) Selects white pine areas for protection.
- (b) Classifies these areas for lumber production, or for aesthetic and recreational values in relation to the feasibility of control.
- (c) Schedules the time interval for reworking control areas.
- (d) Examines burned and logged areas for retention or elimination from control areas.
- (e) Inspects planting sites to select those that are ribes-free.
- (f) Conducts surveys to determine location of host plants, spread of rust, degree of damage, and effectiveness of applied control measures.
- (g) Develops new methods of destroying ribes and tests new chemicals and equipment.
- (h) Recruits and trains seasonal workers for participating agencies.
- (i) Keeps records and maps for all control work.
- (j) Selects sites for seasonal camps.
- (k) Works out practical solutions for troublesome control problems.
- (l) Maintains quarantine restrictions to prevent replanting of ribes in control areas.

### Examples of Recent Activities

1. Ribes eradication has reached a maintenance status on 55 percent of the 26 million acres in the control area and an additional 34 percent has been partially protected. The disease is under control on all white pine areas worth protection in Delaware, New Jersey, Maryland, Kentucky, Tennessee, Georgia, South Carolina, Connecticut, Rhode Island and Massachusetts. As the treated areas reach this maintenance status less work is required to keep the ribes suppressed and more responsibility for maintaining this condition can be taken over by the cooperating agencies. This trend is bringing about consolidations of field offices in several states, the combination of offices in 25 states into 7 areas, and the ultimate integration of blister rust control and white pine management practices.

2. The cooperating agencies under Bureau of Entomology and Plant Quarantine leadership and technical direction destroyed approximately 18,448,100 ribes on 1,389,867 acres of control area. Almost all this work was done by hand pulling the plants.

Acres Worked

Initial work .....	367,480
Rework .....	1,022,387
Total acres worked .....	<u>1,389,867</u>

By Agencies

Entomology and Plant Quarantine and cooperating states .....	1,128,985
Forest Service .....	191,392
Department of the Interior .....	69,490
Total acres worked .....	<u>1,389,867</u>

Ribes eradication was contracted on over 40,000 acres in the western regions. This amounted to 49 percent of the work in the sugar pine region, and 9 percent in the western white pine. Power applications of 2,4-D and 2,4,5-T chemical sprays were applied on over 5,000 acres in these regions. State and local agencies cooperating with the Bureau in work on state and private lands provided more than \$700,000 for this work.

3. The following tables give the status of the work at the end of the calendar year 1950:



**WHITE PINE BLISTER RUST CONTROL**  
**Table 1.--Ribes eradication by operating agencies**  
**during the calendar year 1950**  
**(Initial and Rework)**

Operating Agencies	Initial Eradication (Acres)	Re-eradi- cation (Acres)	Total (Acres)	Effective Labor (Man-days)	Ribes destroyed (Number)
<b>Federal</b>					
National Forests	98,340	93,052	191,392	61,568	7,571,532
Interior Department					
O&G Revested Lands	8,596	960	9,556	2,024	67,919
National Parks	9,780	38,090	47,870	24,265	2,879,828
Indian Reservations	3,595	8,469	12,064	4,860	252,202
Sub-total: Interior	21,971	47,519	69,490	31,149	3,199,949
<b>Total - Federal</b>	<b>120,311</b>	<b>140,571</b>	<b>260,882</b>	<b>92,717</b>	<b>10,771,481</b>
State and Private	247,169	881,816	1,128,985	59,662	7,676,620
<b>Grand Total</b>	<b>367,480</b>	<b>1,022,387</b>	<b>1,389,867</b>	<b>152,379</b>	<b>18,448,101</b>

**Table 2.--Progress of Ribes Eradication on State and Private Lands through 1950**

Region	Total Acres	First Working		2nd Working		Other Workings		On Maintenance		Remaining Work	
		Control Acres	Per Ct.	Acres	Per Ct.	Acres	Per Ct.	Acres	Per Ct.	Unworked Acres	Requiring re- work--Acres
Northeastern	11,134,709	10,607,027	95.3	6,490,893	2,227,296	5,402,304	48.6	527,682	5,204,723	527,682	5,204,723
So. Appalachian	5,297,173	5,254,806	99	202,406	52,324	5,005,932	94	42,367	248,874	42,367	248,874
North Central	3,085,086	2,579,486	83.6	885,786	159,311	1,119,018	36.3	505,600	1,460,468	505,600	1,460,468
Sub-total: East	19,516,968	18,441,319	94.4	7,579,085	2,438,931	11,527,254	59	1,075,649	6,914,065	1,075,649	6,914,065
Northwestern	1,111,730	590,500	53	183,000	71,000	234,280	21	521,230	356,220	521,230	356,220
Pacific Coast	671,222	405,292	60	174,008	104,498	71,656	11	265,930	333,636	265,930	333,636
Sub-total: West	1,782,952	995,792	55.9	357,008	175,498	305,936	17	787,160	689,856	787,160	689,856
<b>Grand Total</b>	<b>21,299,920</b>	<b>19,437,111</b>	<b>91.2</b>	<b>7,936,093</b>	<b>2,614,429</b>	<b>11,833,190</b>	<b>56</b>	<b>1,862,809</b>	<b>7,603,921</b>	<b>1,862,809</b>	<b>7,603,921</b>

Table 3--Progress of Ribes Eradication on Department of Interior Lands through 1950

Region	Total Acres		First Working		2d Working		Other Workings		On Maintenance		Remaining Work	
	Control Area	Acres	Acres	Per Ct.	Acres	Per Ct.	Acres	Per Ct.	Acres	Per Ct.	Unworked	Requiring re-work-Acres
<b>NATIONAL PARKS</b>												
Northeastern	16,872	16,872	16,872	100	16,872	100	8,207		16,872	100	-	-
So. Appalachian	139,064	139,064	139,064	100	7,512		4,257		129,021	92	-	10,043
North Central	1,530	120	120	7.8	-		-		-	-	1,410	120
Subtotal - Eastern	157,466	156,056	156,056	99	24,384		12,464		145,893	93	1,410	10,163
<b>Northwestern 1/</b>												
Pacific Coast	24,510	21,930	21,930	89	10,250		13,710		14,940	61	2,580	6,990
Subtotal - Western	176,694	116,947	116,947	66	83,143		30,900		38,954	22	59,747	77,993
	201,204	138,877	138,877	69	93,393		44,610		53,894	27	62,327	84,983
Total - National Parks	358,670	294,933	294,933	82	117,777		57,074		199,787	56	63,737	95,146
<b>O&amp;C REVESTED LANDS</b>												
Pacific Coast	82,696	44,165	44,165	53	14,641		-		21,275	26	38,531	22,890
<b>PUBLIC DOMAIN LANDS</b>												
Northwestern	29,000	14,000	14,000	48	6,000		3,000		7,000	24	15,000	7,000
<b>INDIAN LANDS</b>												
Southern Appalachian	445	445	445	100	-		-		445	100	-	-
North Central	131,235	125,416	125,416	95.6	72,458		36,296		86,172	65.7	5,819	39,244
Total - Indian Lands	131,680	125,861	125,861	96	72,458		36,296		86,617	66	5,819	39,244
GRAND TOTAL	602,046	478,959	478,959	80	210,876		96,370		314,679	52	123,087	164,280

1/ Includes Mt. Rainier 4,500 a/ acres; Glacier 5,140; Yellowstone 9,600; and Rocky Mountain 5,270 b/  
a/ 400 acres added - previous maps in error.

b/ 730 acres subtracted - private land acreage.



Table 4 - Progress of Ribes Eradication on National Forest Lands through 1950

Region	Total Acres: First Working			Second : Other			On Maintenance			Remaining Work		
	Control	Area	Acres	Per	Working	Workings	Acres	Cent	Per	Unworked	Acres	Requiring re-work - Acres
Northeastern	9,108	8,573	94.1	6,387	3,932	6,050	66.4	535		5,399		87,073
So.Appalachian	1,743,201	1,737,802	99	86,936	37,743	1,650,729	94	71,699		71,699		98,892
North Central	354,713	283,014	80	143,237	52,555	184,122	52	77,633		77,633		188,488
Subtotal-East	2,107,022	2,029,389	96	236,560	94,230	1,840,901	87	324,000		324,000		694,000
Northwestern	1,387,000	1,063,000	77	325,000	105,000	79,410	10	328,742		328,742		364,520
Pacific Coast	772,672	443,930	57	224,626	150,868	448,410	21	652,742		652,742		1,058,520
Subtotal-West	2,159,672	1,506,930	70	549,626	255,868			730,375		730,375		1,247,008
Total	4,266,694	3,536,319	83	786,186	350,098	2,289,311	54					

Table 5 - Progress of Ribes Eradication on Lands in all Ownerships through 1950

Region	Total Acres: First Working			Second : Other			On Maintenance			Remaining Work		
	Control	Area	Acres	Per	Working	Workings	Acres	Cent	Per	Unworked	Acres	Requiring re-work - Acres
Northeastern	11,160,689	10,632,472	95.3	6,514,152	2,239,435	5,425,226	48.6	528,217		528,217		5,207,246
So.Appalachian	7,179,883	7,132,117	99	296,854	94,324	6,786,127	94	47,766		47,766		345,770
North Central	3,572,564	2,988,036	83.6	1,101,481	248,162	1,389,312	39	584,528		584,528		1,598,724
Subtotal-East	21,913,136	20,752,625	95	7,912,487	2,581,921	13,600,665	62	1,160,511		1,160,511		7,151,960
Northwestern	2,552,240	1,689,430	66	524,250	192,710	625,220	24	862,810		862,810		1,064,210
Pacific Coast	1,703,284	1,010,334	57	496,418	286,266	211,295	12	692,950		692,950		799,039
Subtotal-West	4,255,524	2,699,764	63	1,020,668	478,976	836,515	20	1,555,760		1,555,760		1,863,249
Total	26,168,660	23,452,389	90	8,933,155	3,060,897	14,427,180	55	2,716,271		2,716,271		9,015,209



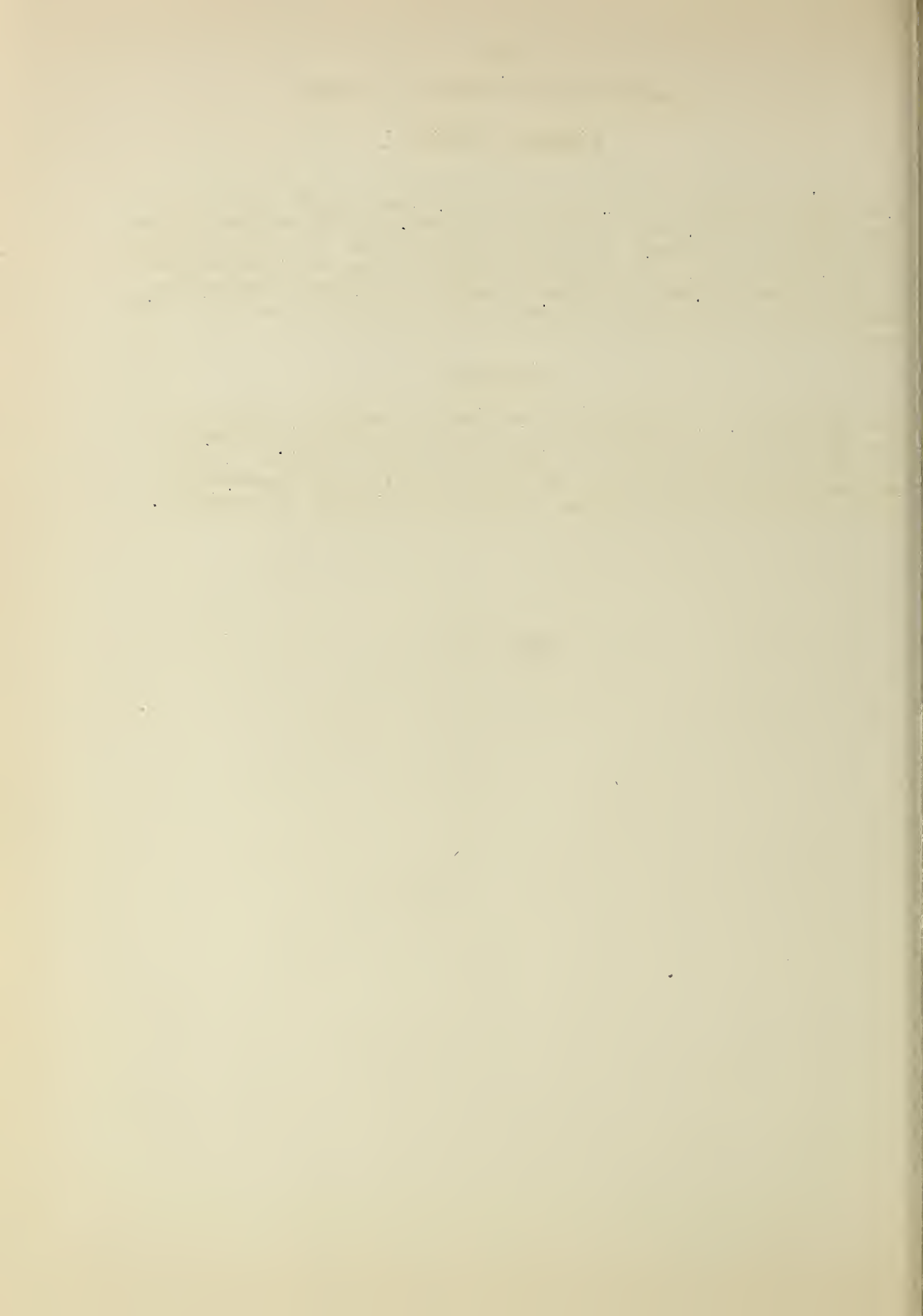
PASSENGER MOTOR VEHICLES AND AIRCRAFT

Passenger Vehicles

The Budget estimates for the fiscal year 1953 propose the replacement of nine passenger motor vehicles all of which will be 1944 or older models and will have been driven in excess of 60,000 miles. The work conducted is in widely separated areas, and the number of cars now being maintained is the minimum required to transport supervisory personnel throughout these areas. This number is necessary for the efficient conduct of the work.

Airplanes

Two replacements for planes which are used for detection surveys in forested areas are requested. The surveys are conducted to determine the status of forest pests as a basis for control measures. The two replacements will be made only in the event it is found impracticable or uneconomical to make repairs to those planes already in operation.



## FOREST SERVICE

### Purpose Statement

The Forest Service is charged with responsibility for promoting the conservation and wise use of the country's forest and related watershed lands, which comprise one-third of the total land area of the United States. Authority for the work of the Service stems from numerous acts, the more important ones being the Timber Culture Repeal Act of March 3, 1891; Sundry Civil Appropriation Act of June 4, 1897; "Transfer" Act of February 1, 1905; "Weeks" Act of March 1, 1911; Act of June 7, 1924; Forest Research Act of May 22, 1928; and Cooperative Forest Management Act of August 25, 1950.

To meet its responsibility the Forest Service engages in three main lines of work, as follows:

(1) Management, protection, and development of the National Forests.

Under instructions from Secretary Wilson in 1905 this is to be done for "the greatest good of the greatest number in the long run." This in turn calls for obtaining the maximum practicable yield and use of their many resources on a continuing basis, to meet both local and national needs--under normal conditions and during times of stress. The 181,000,000 acres of National Forests are located in 40 States, Alaska, and Puerto Rico.

In managing the National Forests technical forestry is applied to the growing and harvesting of timber crops. Estimated harvest through timber sales in 1952 is 4.6 billion board feet. The grazing of approximately nine million head of livestock is scientifically managed to obtain range conservation along with use of the annual growth of forage. Watersheds are managed for regulation of stream flow, flood control, sources of water for power, irrigation, navigation, and municipal supply. Some provision is made for over 25,000,000 visits of people to the National Forests for recreation purposes. Effort is made to apply needed scientific management to the extensive wildlife resources. Receipts from timber sales, grazing permits, land rentals, and water power permits exceeded \$57,000,000 in 1951. Estimated receipts for 1952 are \$62,000,000. In addition, collections for the Cooperative Work Fund and for Expenses of Brush Disposal, which are available to the Forest Service for specified purposes, are estimated at \$8,400,000 in 1952 and 1953.

The protection of the National Forests is a major responsibility and includes the control of forest fires which numbered 9,938 in the first ten months of the calendar year 1951; the control of tree diseases and insect epidemics; and the prevention of trespass.

The major development activities on the National Forests consist of:

- (a) Reforestation of denuded and lightly stocked forest lands.
- (b) Revegetation of denuded range lands.
- (c) Construction of improvements, mainly roads which are extremely important (and largely self-liquidating) because of the large bodies of inaccessible mature and overmature timber on the National Forests which are needed for housing and other uses. About one-third of the remaining saw timber in the country is in the National Forests.



(d) The acquisition of additional forest land through purchase and exchange.

(2) Cooperation with the States and private forest landowners is provided by the Forest Service:

(a) To obtain better fire protection on the 427,000,000 acres of State and privately owned forest lands.

(b) To obtain better forest practices on and returns from 345,000,000 acres of commercial forest lands in private ownership. Only about 8 percent of the cutting on such lands is now being done in line with good forestry practice.

(c) To aid in the distribution of planting stock to private forest landowners for the purpose of establishing forests and shelter belts.

(d) To stimulate development and proper management of State, county, and community forests.

(3) Forest and Range Research. The Forest Service conducts investigations in the entire field of forestry and range management, regardless of ownership, including the growth, protection, and harvesting of timber; management of range lands; protection and management of watersheds; and research in forest economics. It is conducting a forest survey of the United States--a study of present extent and potential growth and utilization of the Nation's forest resources. Research to obtain greater use of the tremendous waste, and to obtain more efficient and economical utilization of forest products, is a major program, centered at the Forest Products Laboratory, Madison, Wisconsin. The results of research are available to consumers and manufacturing plants generally, to the more than 4,000,000 owners of private forest and range lands, and to the many public agencies which administer such lands.

In addition, the Forest Service carries on the following activities:

(4) Flood Control. In areas assigned by the Secretary, the Forest Service makes preliminary examinations and surveys under the Flood Control Act of 1936, as amended and supplemented, and installs watershed improvement measures to retard runoff and reduce flood water and sediment damage in Congressionally authorized watersheds. The Service has primary responsibility for watershed improvement measures on National Forests and adjacent range lands used in conjunction with such forests, and other forest lands. Work on non-Federal lands is carried on in cooperation with appropriate State and local agencies.

(5) Work performed for others. Because of the widespread geographical location of Forest Service activities, the technical skills available in the organization, and for other similar reasons, the Forest Service is frequently called upon to perform services for other Federal, State, and private agencies on a reimbursable or advance payment basis. All projects benefit the Forest Service as well as the cooperator. Examples of these activities are:

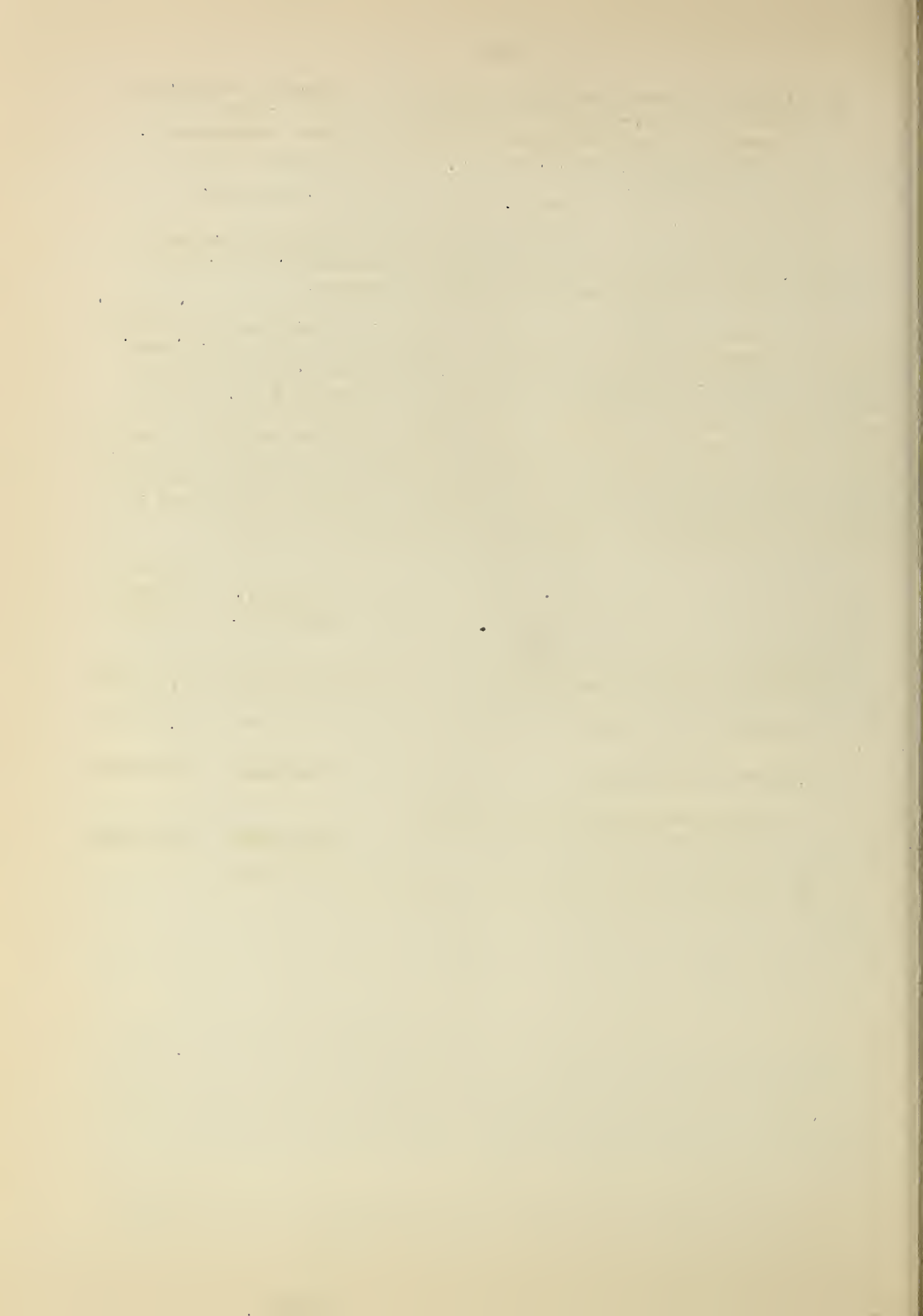
(a) Protection of private and other Federal forest lands intermingled with the National Forests.

- (b) Disposal of slash resulting from sales of timber to contractors on National Forests, and the rehabilitation of such areas.
- (c) Construction and maintenance of roads, and other improvements.
- (d) Investigations in forest, range, and water management and utilization problems.
- (e) Cooperative survey, mapping, administrative, reforestation projects, etc.
- (f) Cooperation with the National Production Authority on requirements, production, and supplies of forest products and in stimulation of lumber production through various devices.

The Forest Service maintains its central office in Washington with program activities decentralized to 10 Regional offices, 135 Forest Supervisors' offices, 770 District Rangers' offices, 12 Forest and Range Experiment Stations, and the Forest Products Laboratory. On November 30, 1951, the Forest Service had 9,157 full-time employees, of whom 313 are in the central office and the remainder in the field, and 1,984 part-time employees in the field. The November 30 employment figures for the field are lower than average for the year because of seasonal factors. At the peak of the field season, the number of full-time employees is about 16,300, and the part-time, including casual employees, is approximately 10,000.

	Estimated, <u>1952</u>	Budget Estimate, <u>1953</u>
Appropriated funds:		
National forest appropriations	a/ \$52,172,153	\$51,054,680
Cooperation with States	10,798,000	10,793,000
Research appropriations	<u>5,416,603</u>	<u>5,397,000</u>
Total appropriated funds (excluding permanent appropriations)	<u>68,386,756</u>	<u>67,244,680</u>

a/ Includes \$3,316,448 available from prior year balances.





FOREST SERVICE

Summary of Appropriations, 1952, and Estimates, 1953

(Amounts for 1952 include estimated pay adjustment supplementals)

Appropriation Item	Total estimated available, 1952	Budget estimates, 1953	Increase (+) or decrease (-)
Salaries and Expenses:			
National forest protection and management .....	\$28,814,025	\$30,018,000	+\$1,203,975
Fighting forest fires .....	a/ 6,000,000	6,000,000	- -
Forest research .....	5,416,603	5,397,000	-19,603
Total, Salaries and expenses ....	40,230,628	41,415,000	+1,184,372
Forest development roads and trails .	b/ 13,000,000	13,000,000	- -
Smoke jumper facilities .....	- -	970,000	+970,000
Acquisition of lands for national forests:			
Weeks Act .....	75,000	75,000	- -
Superior National Forest .....	c/ 125,000	150,000	+25,000
Acquisition of land from national forest receipts .....	141,680	141,680	- -
State and private forestry cooperation:	10,798,000	10,793,000	-5,000
Cooperative range improvements .....	d/ 700,000	700,000	- -
Payments to school funds, Arizona and New Mexico, national forests fund (permanent) .....	107,294	107,294	- -
Expenses, brush disposal (permanent).	1,400,000	1,400,000	- -
Payments to Minnesota, national forest fund (permanent) .....	45,000	45,000	- -
Payments to states and territories from national forests fund (permanent) .....	13,975,000	15,020,000	+1,045,000
Roads and trails for states, national forest fund (permanent) .....	5,600,000	6,000,000	+400,000
Total .....	86,197,602	89,816,974	+3,619,372
Deduct permanent appropriations (shown in detail above) .....	21,127,294	22,572,294	+1,445,000
Total, excluding permanent appropriations .....	65,070,308	67,244,680	+2,174,372

a/ Includes \$591,429 obligated in prior year.

b/ In addition, there is a prior year balance available of \$3,569,420.

c/ In addition, there is a prior year balance available of \$82,002.

d/ In addition, there is a prior year balance available of \$231,340.



(a) Salaries and Expenses

	National Forest Protection and Management	Fighting Forest Fires	Forest Research	Total
Appropriation Act, 1952 .....	\$27,322,025	\$6,000,000	\$5,108,603	\$38,430,628
Anticipated pay adjustment supplemental .....	1,492,000	- -	308,000	1,800,000
Base for 1953 .....	28,814,025	6,000,000	5,416,603	40,230,628
Budget Estimate, 1953 .....	30,018,000	6,000,000	5,397,000	41,415,000
Increase .....	+1,203,975	- -	-19,603	+1,184,372

SUMMARY OF INCREASES AND DECREASES, 1953

National Forest Protection and Management:

To provide for administering an increased volume of timber and timber products sales business involving a total cut of 5 billion board feet and performing work necessary to prepare timber sales areas for sale .....	+\$1,086,603
To strengthen the prevention, detection, and initial attack phases of fire control .....	+370,000
Decrease due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this subappropriation .....	-3,224
Decrease due to partial absorption of pay adjustment costs .....	-249,404
Subtotal .....	+1,203,975

Forest Research:

For research on halogeton .....	+31,397
Decrease due to partial absorption of pay adjustment costs .....	-51,000
Subtotal .....	-19,603

PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase or decrease Pay ad- justment absorption	Other	1953 (estimated)
1. <u>National forest protection and management:</u>					
a. <u>Resource pro- tection and use</u>	\$25,689,086	\$26,916,425	-\$236,804	+\$1,453,379(1)	\$28,133,000
(1) Timber re- source manage- ment .....	(4,839,199)	(5,160,275)	(-45,604)	(+1,083,379)	(6,198,050)
(2) Range re- source manage- ment .....	(1,011,007)	(1,046,200)	(-9,200)	- -	(1,037,000)
(3) Wildlife re- source manage- ment .....	(141,953)	(143,715)	(-1,500)	- -	(142,215)

(Continued on next page)



Project	1951	1952 (estimated)	Increase or decrease		1953 (estimated)
			Pay ad- justment absorption	Other	
(4) Water re- source manage- ment .....	(59,722)	(52,590)	(-600)	- -	(51,990)
(5) Sanitation and care of public camp grounds .....	(627,730)	(652,900)	(-6,800)	- -	(646,100)
(6) Management of other land uses .....	(632,201)	(674,310)	(-7,000)	- -	(667,310)
(7) Maintenance of improvements	(2,759,466)	(2,846,510)	(-22,500)	- -	(2,824,010)
(8) Forest fire protection ..	(7,846,045)	(8,189,840)	(-68,400)	(+370,000)	(8,491,440)
(9) Construction of improvements	(260,164)	(275,115)	(-2,200)	- -	(272,915)
(10) Unit manage- ment .....	(7,511,599)	(7,874,970)	(-73,000)	- -	(7,801,970)
b. Resource devel- opment .....	1,761,187	1,897,600	-12,600	- -	1,885,000
(1) Reforestation	(1,052,517)	(1,137,858)	(-7,400)	- -	(1,130,458)
(2) Range revege- tation .....	(708,670)	(759,742)	(-5,200)	- -	(754,542)
Subtotal.	27,450,273	28,814,025	-249,404	+1,453,379	30,018,000
2. Fighting forest fires .....	6,096,221	6,000,000	- -	- -	6,000,000
3. Forest research:					
a. Forest and range management inves- tigations .....	3,013,742	3,249,037	-30,600	+31,397(2)	3,249,834
(1) Experimental forests and ranges .....	(2,888,694)	(3,114,667)	(-29,334)	(+31,397)	(3,116,730)
(2) Fire control investigations	(125,048)	(134,370)	(-1,266)	- -	(133,104)
b. Forest products investigations.	1,291,255	1,261,168	-11,900	- -	1,249,268
(1) Forest Prod- ucts Labora- tory .....	(1,106,562)	(1,080,725)	(-10,197)	- -	(1,070,528)
Conditioning and protec- tion of wood products .	[291,932]	[286,815]	[-2,705]	- -	[284,110]
Properties investiga- tion and wood prod- ucts devel- opment ...	[391,229]	[381,795]	[-3,605]	- -	[378,190]

(Continued on next page)

Project	1951	1952 (estimated)	Increase or Decrease		1953 (estimated)
			Pay	Other	
			adjustment: absorption:		
(1) Forest Products Laboratory, Continued:					
Pulp and paper:	[169,202]	[166,825]	[-1,575]	[- -]	[165,250]
Chemically converted and derived products investigations	[254,199]	[245,290]	[-2,312]	[- -]	[242,978]
(2) Forest utilization service	(184,693)	(180,443)	(-1,703)	( - -)	(178,740)
c. Forest resources investigations	854,259	906,398	-8,500	- -	897,898
(1) Forest survey	(779,025)	(823,698)	(-7,725)	- -	(815,973)
(2) Economic investigations	(75,234)	(82,700)	(-775)	- -	(81,925)
Forest Research:					
Subtotal ...	5,159,256	5,416,603	-51,000	+31,397	5,397,000
Subtotal	38,705,750	40,230,628	-300,404(3)	+1,484,776	41,415,000
Unobligated balance	92,145	- -	- -	- -	- -
Total pay adjustment costs	[- -]	[2,169,000]	[+143,287]	[+119,000]	[2,431,287]
Total available	38,797,895	40,230,628	-300,404	+1,484,776	41,415,000
Transferred from:					
"Forest fire protection, Department of Agriculture" .....	-17,700	- -			
"Farm and other private forestry cooperation, Department of Agriculture"	-13,100	- -			
"Acquisition of land for national forests, Weeks Act" ..	-21,000	- -			
Transferred to:					
"Operating expenses, General Services Administration" ...	+35,075	- -			
"Expenses of Defense Production" .....	+61,231	- -			
Available from subsequent year appropriation	-591,429	- -			
Available in prior year	+495,208	- -			

(Continued on next page)

Project	1951	1952 (estimated)
Transfer in 1952 estimates to:		
"Forest Development Roads and Trails" ...	+\$94,900:	- -:
"Forest Fire Cooperation, Department of Agriculture" .....	+24,900:	- -:
"Farm and Other Private Forestry Cooperation"	+42,900:	:
"Salaries and Expenses, Office of Information, Agriculture" .....	+4,700:	- -:
Reduction pursuant to Sec. 1214 .....	+61,420:	- -:
Anticipated pay act supplemental .....	- -:-\$1,800,000:	:
Total appropriation or estimate .....	38,975,000:	38,430,628:

#### INCREASES

(1) An increase of \$1,453,379 under the project "Resource protection and use", as follows:

(a) A net increase of \$1,083,379 under the subproject "Timber resource management" as follows:

1. An increase of \$1,086,603 to provide for administering an increased volume of timber and products sales business involving a total cut of 5 billion board feet and performing work necessary to prepare timber sale areas for sale.

Need for increase: The proposed increase consists of (1) \$440,000 for stepping up the cut of national forest timber in the amount of .4 billion board feet in accordance with good forestry practices, and (2) \$646,603 for preparing, appraising, and placing on the market 2.4 billion board feet of timber, a most essential phase of the operation if the cut is to be increased or even maintained.

The increase in cut would result in a substantial contribution toward needed national lumber production, improve the timber stands on the national forests by removing overmature timber, and return to the Treasury approximately \$6,000,000 at current prices.

The timber cut from national forest lands in F.Y. 1951 totaled 4.688 billion board feet. This was the largest timber sale business for any fiscal year in the history of the Forest Service. This rate of cutting is expected to be maintained in F.Y. 1952, and will sorely deplete the shelf of sale areas inventoried and ready for sale. This need for sale preparation will be further accentuated by the increased cut of national forest timber in the amount of .4 billion board feet contemplated in the Budget Estimate.



There are a number of reasons why the rate of cutting on the national forests should be built up to the highest possible level under sustained yield management. The most important of these are:

- (1) Increased sales mean increased revenue to the Federal Treasury. The average value of the total national forest timber cut is now more than \$10.00 per M (thousand board feet). The average over-all cost of timber sale administration is less than \$1.25 per M.
- (2) A full scale cutting program is needed to salvage the dead and dying timber which develops from year to year. The total volume of these losses is as great and serious as those resulting from major insect epidemics or fires. There are also needs for light cuts to salvage scattered dead and dying material. Approximately 700 million board feet of national forest timber was killed by fire during the 1950 season. About 500 million board feet of this total is on the Olympic forest of western Washington. All of this timber must be cut within the next few years if excessive deterioration is to be avoided. If this fire-killed timber is not salvaged, danger of fire recurrence will be excessive for decades. There would be little prospect to grow a new crop of trees on these burns until the fire-killed timber has been cut and removed.
- (3) Cutting transforms stagnant overmature stands into regenerated areas where growth will be rapid. In western Oregon and Washington 20,000 to 25,000 acres are now being clear-cut each year, mostly in patches of about 40 acres in extent. An adequate seed source for regeneration is retained in the green timber surrounding these patches. In event a seed year does not come along within 2 to 4 years after cutting, which is the period when brush competition does not seriously impede natural regeneration, the cut-over area is planted. The timber which is harvested in these clear cuttings is in mature or older stands where decay and mortality offsets growth. After cutting and regeneration, these areas are started on a new growth cycle. An average of over 500 board feet per acre per year could be produced in the course of a 100-year rotation.
- (4) Release and improvement of growing timber stands can be accomplished through commercial sales. While by no means limited to the South, some of the most striking opportunities and accomplishments from improvement cuttings through timber sales occur there. Most of the more than 300 million board feet of sawlogs worth about \$6,500,000 which are harvested annually from the southern national forests come from trees which have been marked for cutting in order to improve the growing possibilities of the remaining timber stand. In addition to these main harvest-improvement cuts almost 200,000 cords of pulpwood are cut. Around 90% of this material is pine and most of it is from small, over-crowded trees. This pulpwood harvesting increases the rate of growth on the remaining trees of the stand.

Plan of Work: The requested increase of \$1,086,603 is required for:

- (1) Administration of an increased cut of 400 million board feet of timber at a cost of \$1.10 per thousand board feet cut (\$440,000). This amount would be used for the employment of tree markers, timber scalers and other project sales personnel.
- (2) The preparation of 2.4 billion board feet for sale at a cost of 27 cents per thousand board feet prepared for sale (total \$646,603). The work would consist of detailed examination of areas to be cut, determining how the timber is to be cut, appraising the timber, negotiating and preparing contracts. Of the 2.4 billion bd. ft. which would be prepared for sale with the increased funds requested, it is estimated that 1.6 billion bd. ft. would be placed under formal contract by the end of the fiscal year 1953, and 400 million bd. ft. would actually be cut under those contracts in that year.

2. A decrease of \$3,224 due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation.

(b) An increase of \$370,000 under the subproject "Forest fire protection" to strengthen the prevention, detection, and initial attack phases of fire.

Need for Increase: Additional funds are urgently needed to permit employment of a greater number of men for the purpose of improving detection of and initial attack on fires. During the period 1906-1950 fires damaged natural resources on more than 20,000,000 acres of national forest lands. Volume of timber resources destroyed during this period was in excess of 20,000,000,000 bd. ft. or equal to more than 4 times the volume of national forest timber cut during fiscal year 1950. At 1950 stumpage rates this national forest timber destroyed by fire (since 1906) would have a market value of \$194,000,000.

The damaging effect of fire on the other important resources such as watersheds, soils, recreation, game and forage have been exceedingly heavy. No accurate means has been devised to measure these losses in terms of dollars and cents. However, it is conservatively estimated that watershed damage from fires could very well be in the neighborhood of \$300,000,000 over the period 1906-1950. Resource losses resulting from fire were heavier during the early period when practically no organized fire protection existed and became less as the fire organization was improved. The average annual losses of timber by periods reflects each improvement in the fire organization. The following data on timber losses clearly indicate relation of losses to improvements in accessibility of the forested areas, in organizational strength and in techniques of fire fighting.



<u>Period</u>	<u>Type of Organization and Accessibility to Fires</u>	<u>Average Vol. of Timber Lost Each Year</u>
1906 - 1910	No formal fire organization and accessibility to fires very poor. Pioneering period.	1,402,000,000 ft. b.m.
1911 - 1920	Beginning of organized protection, accessibility still poor. Strength of force still weak.	576,000,000 ft. b.m.
1921 - 1932	Improvement in organized protection and strength of forces to attack fires, accessibility somewhat improved.	368,000,000 ft. b.m.
1933 - 1941	Period when 14,566 men available for detection and initial action on fires. Accessibility greatly improved during this period. Numerous fire improvements such as lookout towers, telephone lines, firemen stations constructed or replaced during this period.	145,000,000 ft. b.m.
1944 - 1945	Most adequately financed period since elimination of emergency relief forces; 9,477 men financed for detection of and initial attack on fires. Accessibility about the same as during the latter part of the previous period. Fire control plans, techniques and tactics greatly improved.	72,000,000 ft. b.m.
1950	Higher costs makes 1950 the least adequately financed year since 1944. The strength of the initial action fire organization has declined greatly since 1941. It dropped from a high of around 14,000 men in the period 1933-1941 to 9,477 men in 1944 and to a new low of 6,064 men during 1950. Timber losses in 1950 rose to	115,000,000 ft. b.m.
1951	The organization available for the detection of and initial action on fires was less than in 1950 due to the rising costs of operations. This lower efficiency resulting from lack of adequate initial action forces, coupled with unfavorable weather conditions, is reflected in the increasing losses of resources that are occurring.	1,077,000,000 ft. b.m. (estimated)



These losses are serious. The Forest Service has demonstrated that with adequate forces such as was the case during certain periods in the past these losses can be held to an acceptable minimum even though the fires start when weather conditions are critical. Fire protection plans now on file, reflecting the considered judgment of the best informed corps of experts in the control of forest fires, do not call for as many men (14,566) as were used during the 1933-1941 period for initial action on fires. Such plans do, however, call for 10,500 men or approximately 4,500 more men than are available during fiscal year 1952.

With an inadequate initial attack force to control fires during periods of critical weather, heavy expenditures are required to control the fires that escape the initial attack forces. This is in addition to the heavy losses in timber and other natural resources resulting from such fires.

Fiscal year 1951 ended with obligations of approximately \$6,100,000 for suppression. Direct obligations for fire suppression for fiscal year 1952 are likely to exceed \$9,000,000 primarily because the initial action organization is below planned strength by 43 percent and because of unfavorable weather conditions. Since the amount available for obligation in 1952 is \$5,408,571, a supplemental appropriation in the neighborhood of \$3,500,000 is indicated.

Plan of Work: This request for \$370,000 will be used to employ additional lookouts, firemen and trained suppression squads, in order to reduce elapsed time between (1) the start of fires and discovery, (2) discovery and initial action, and (3) initial action and control. This would help narrow the wide gap between an adequate force and the present inadequate fire protection organization now attempting to hold losses of resources to a tolerable level. Average length of employment of the additional initial action forces will approximate 3 to 4 months each year.

(2) An increase of \$31,397 under the project "Forest and range management investigations" for research on the control of halogeton.

Need for increase: Halogeton, an introduced poisonous weed, poses a serious threat to the range livestock industry in many sections of the west. First found near Elko, Nevada, in 1934, the weed now occurs in Idaho, Wyoming, Montana, Utah and California, in addition to Nevada. Halogeton is a prolific seeder. It spreads rapidly and establishes itself where the natural vegetation has been depleted or the soil disturbed, moving first into trails, roadsides and corrals and other livestock concentration areas. It has become widely established on abandoned fields, and on burned and overgrazed ranges.

The importance of the control of halogeton is evidenced by the fact that the Supplemental Appropriation Act, 1952, provided \$2,300,000 to the Bureau of Land Management and the Bureau of Indian Affairs of the Department of the Interior for control of halogeton on lands under their jurisdiction. The weed grows annually from seed and the best known control to date is to build up the perennial range vegetation

through reseeding and better range management. Unfortunately, halogeton occurs on many dry, saline desert sites where suitable species and effective methods for successful reseeding are yet unknown.

It is proposed to intensify range reseeding research in these drier desert conditions where halogeton is a problem. Grazing management research will also be undertaken to determine methods or seasons of grazing livestock on the range that will minimize death losses from the halogeton. It is urgent that research to develop economical, practical and effective control methods be undertaken as early as possible.

This research will be coordinated with that proposed by the Bureau of Plant Industry, Soils, and Agricultural Engineering to develop more direct methods of control by intensive study of the plant physiology and the use of herbicides.

Plan of Work: The work proposed would be conducted on experimental forests and ranges located in the western United States and on other areas especially set aside because they meet the particular needs of the research to be done. These areas may be on national forests or on land provided by cooperators. Technical specialists who are particularly well qualified to handle research in each field will be assigned to the problem area concerned. All of the work will be under the direction of the forest and range experiment station in which region the particular problem area lies.

(3) A decrease of \$300,404 due to partial absorption of pay adjustment costs which will be met by reducing funds for various activities as shown in the Project Statement.



### CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored, deleted matter enclosed in brackets):

For expenses necessary, \* \* \* to erect necessary buildings:

Provided, That the cost of any building purchased, erected,

- 1 or as improved, exclusive of the cost [(not to exceed \$1,000)] of constructing a water-supply or sanitary system and of connecting the same with any such building, and exclusive of the cost of any tower upon which a lookout house may be erected,
- 2 shall not exceed \$15,000, (\$22,500 in Alaska), with the exception that any building erected, purchased, or acquired, the cost of which was \$15,000 or more, may be improved out of the appropriations made under this Act for the Forest Service by an amount not to exceed 2 per centum of the cost of such building as certified by the Chief of the Forest Service; \* \* \*

Forest research: For forest research at forest or range experiment stations, the Forest Products Laboratory, or elsewhere, in accordance with the provisions of sections 1, 2, 7, 8, 9, and 10 of the Act approved May 22, 1928, as amended, (16 U.S.C. 581, 581a, 581f-581i), including the construction and maintenance of improvements; fire, silvicultural, watershed, and other forest investigations and experiments; investigations and experiments to develop improved methods of management of forest and other ranges; experiments, investigations, and tests of forest products; a comprehensive forest survey; and investigations in forest economics; [\$5,108,603: Provided, That hereafter funds may be received from any State, other political subdivision, organization, or individual for the

- 3 purpose of establishing or operating any forest research facility located within the United States, its Territories, or possessions] \$5,397,000.

The first change proposes to delete language contained in the preamble limiting the cost of water supply and sanitary systems. The limitation of \$1,000 is adequate for all but the occasional installation. In the Southwest, well drilling costs are high because of the depths to which wells must be drilled to obtain potable water. In Alaska, the rough terrain, heavy vegetative cover, character of soil, and high labor and material costs make it difficult to complete a water supply and sanitary system, including the necessary pipe lines and septic tank. The recommended change is not intended to provide for the construction of extravagant water supply and sanitary systems. However, it is needed to permit the construction of adequate systems where physical conditions result in higher than normal costs.

The second change proposes to increase the building limitation in Alaska from \$15,000 to \$22,500. A 50 percent differential for Alaska is required to meet the higher labor and material costs which prevail in that area, the difficulties encountered in excavating muskeg and blue clay soils, the necessity of water proofing all sub-surface walls and the necessity



of constructing very substantial dwellings because of inclement weather conditions. A few dwellings will be necessary in the near future because of an increasing work load on the Alaska National Forests which will necessitate the employment of additional personnel. Very little rental housing is available in Alaska, and either the Government or the employee must construct dwellings if adequate housing is to be provided. Since Forest Service employees are transferred frequently it is not advisable to require them to provide housing.

The third change proposes the deletion of the proviso contained in the 1952 Act authorizing the receipt of contributions from States, other political subdivisions, organizations, or individuals for forest research since this language is permanent legislation.



## STATUS OF PROGRAM

Current Activities: The purpose of this National Forest Protection and Management program is to manage, protect, and develop the national forests and insure that timber, water, range, recreation, wildlife, and other resources are utilized in a manner so as to best serve the Nation.

The economic importance of the national forests will be realized when it is considered that:

- a. They provide a source of forest products in emergencies and a measure of assurance for a future timber supply. The rapid depletion of timber on private lands causes the national forests to assume increased importance as a source of timber. The annual allowable cut from the national forests is 6,000,000,000 board feet. At present approximately three-quarters of the allowable cut is being harvested. This is approximately 9 percent of the annual lumber production in the United States.
- b. The area within the national forest boundaries is equivalent to some 10 percent of the area of the continental United States.
- c. The national forests produced a cash income in the fiscal year 1951 in excess of \$57,000,000. Approximately 65 percent of this income is deposited in the Federal Treasury as miscellaneous receipts. In addition, the Forest Service renders services such as watershed protection, certain recreation uses, wildlife management, and other minor services for which no charge is made.
- d. They provide range for some 9,000,000 head of domestic live-stock.
- e. They provide protection to municipal water supplies for nearly all western cities and towns and many in the East, and to irrigation water used on some 20,000,000 acres of western lands, as well as to many streams with water power developments. They provide flood protection to thousands of acres of rich valley lands and prevent the siltation of reservoirs and stream channels.
- f. They provide a habitat for a large part of the big game animals, birds, and for millions of small game animals and furbearers.
- g. They provide opportunities for healthful outdoor recreation, with a minimum of restrictions, for the millions of people who yearly visit the national forests.
- h. Nearly 4,000,000 people who live in and near the national forests are supported in whole or in part through the management and utilization of the forests and their resources.

National forest boundaries encompass an aggregate area of 228,000,000 acres reaching geographically into 40 states, Alaska, and Puerto Rico, of which 181,255,449 acres are under Forest Service administration. Many tracts of privately owned lands are interspersed within the Federal holdings.



National forests are managed under the multiple use principle with practically all areas used for, or serving, more than one purpose or objective. For example, 50 percent of the area within the national forests of the continental United States serves five different purposes: (1) timber production, (2) watershed protection, (3) forage production, (4) wildlife production, and (5) recreation. An additional 28 percent serves four purposes in varying combinations. Of the remainder, 21 percent of the total serves three purposes with only 1 percent of the total reserved for one purpose exclusively, mainly camp grounds and special use areas such as summer home sites, pastures, corrals, etc.

The varied interests which inevitably conflict and which must be reconciled, the vast areas covered, and the unusual complexities, clearly demonstrate the necessity of careful planning for, and skillful management of, the national forest properties.

The protection of national forests from fire and trespass is made difficult by the large area to be protected, the general inaccessibility of the national forests, the many thousands of miles of exterior boundary, and the impossibility of taking preventive action when dealing with such a problem as lightning-caused fires (nearly 5,000 in the calendar year 1951).

#### Selected Examples of Recent Progress:

##### 1. Resource Protection and Use:

Receipts deposited to the "Forest Reserve Fund" in the fiscal year 1951 increased \$22,550,373 over the fiscal year 1950. The following table summarized the receipts data for the fiscal years 1950 and 1951:

<u>Forest Reserve Fund</u>	<u>1950</u>	<u>1951</u>	<u>Increases</u>
Timber .....	\$29,380,134	\$51,098,565	\$21,718,431
Grazing .....	3,385,068	4,165,573	780,505
Land Use, Power, etc. ....	<u>830,329</u>	<u>883,204</u>	<u>52,875</u>
Subtotal .....	33,595,531	56,147,342	22,551,811
<u>Suspense Account, Alaska<sup>1/</sup></u>	77,148	146,049	68,901
<u>Special Account, O&amp;C Lands<sup>2/</sup></u>	<u>868,324</u>	<u>1,266,878</u>	<u>398,554</u>
Total Receipts <sup>3/</sup> .....	34,541,003	57,560,269	23,019,266

- 1/ Suspense account established pending settlement of Indian rights on Tongass Forest, Alaska.
- 2/ Special account established pending determination of the custody of certain lands in Oregon.
- 3/ Receipts for the first quarter fiscal year 1952 are \$22,838,316, an increase of \$7,712,867 over the same period of fiscal year 1951.

Net area of lands under Forest Service administration increased from 181,204,638 acres as of June 30, 1950, to 181,255,449 acres on June 30, 1951, or 50,811 acres.

Timber Sales. Timber cut from the national forests in fiscal year 1951 totaled 4,688,280 M bd. ft., with receipts deposited to the Forest Reserve fund of \$51,098,565. In addition, land exchange cutting rights were liquidated in the amount of \$1,283,858. This is an increase of 1,186,343 M bd. ft., or 34 percent, in volume and \$21,718,431, or 74 percent in receipts over the amounts cut in fiscal year 1950. This is the largest cut ever made from the national forests in any one year. The lumber market experienced a spectacular rise during the forepart of calendar year 1950 due primarily to increased domestic demands. Following the Korean crisis this demand was increased, with lumber rating high on the list of materials critical for the national defense. Adjustments in the work program of the Forest Service made it possible to administer the sharply increased production within the total funds available.

The average price of timber cut during fiscal year 1951 was \$10.20 per M bd. ft., an increase of \$1.43 over the value of timber cut in fiscal year 1950.

The General Ceiling Price Regulation of January 25, 1951, caused a slight interruption in the sales program due to the necessity for determination of ceiling prices and readvertisement of sales offers already in process on that date. By amendment 17 of April 10, 1951, sales of standing timber were exempted from the ceiling price order.

Timber Management. Progress in management is told strikingly by an example on the Davy Crockett National Forest in East Texas. Purchased in 1935-36, this forest contains 157,000 acres of good timber growing land. Under management the young pine and hardwood stands are growing at a rapid rate, but still are understocked. From 1937 through 1950 about 200 million feet of pine and hardwood saw timber and pulpwood were cut, but the volume of timber increased very materially during the same period. Shortleaf and loblolly pines are the important species. The desired pine growing stock has been determined to be 4 million cords (2 billion board feet). The present stocking, 2.1 million cords, will be increased through growth during the current decade to 3.1 million cords. Thus, rebuilding will reach 78 percent of the goal through cutting only 36 percent of current growth. Meanwhile, sale of the allowable annual cut, 48.1 million board feet, will provide needed sawlogs and pulpwood for local mills and return to the Treasury annual amounts which exceed cost of administration.

This example depicts the value of managing the forests for immediate as well as long-range benefits to the local communities and the Nation as a whole, and is indicative of the timber management work on national forests, where intensive utilization exists.

Forest Fire Protection. In the West, as a whole, the 1951 fire season proved to be one of the most serious that has been experienced in recent years. The drought in Arizona, New Mexico, and California continued and was extended to southern Colorado, Oregon, Washington, Idaho, Nevada, and western Montana.



The northwestern States of Oregon and Washington were faced with a very grave situation. The extensive high-hazard slash areas and a very long spring and summer drought period combined to bring about the worst fire situation experienced in the past 35 years in these two states. Fires in the heavy fuels of this region under such conditions are extremely difficult and costly to control and as of October 1, 773 fire killing 750,000,000 ft. b.m. of merchantable timber had started.

The conditions in Arizona and New Mexico were even more severe than in 1950. Losses to natural resources were particularly severe during June and early July 1951 when 104,000 acres burned; and 65,000,000 ft. b.m. of timber was killed. Four large fires, burning simultaneously, required mobilization of manpower and equipment from all western states.

California experienced another severe fire season resulting primarily from the accumulated drought. Resource damages were particularly heavy on the Modoc, Klamath, Trinity, San Bernardino, Plumas, Six Rivers, and Los Padres National Forests where 90,000 acres of valuable watershed and timber lands were burned over.

In Idaho and Montana the number of lightning fires increased over that which had been experienced in recent years. The southeastern States had more fires than is considered normal for that region.

The low strength of initial action fire protection forces, the extensive areas of logging slash, the drought, and increased industrial and recreation use of the national forests combined to make 1951 one of the most difficult fire years of recent record. Damage to resources was very heavy particularly in Oregon, Washington, California, New Mexico, and Arizona where it is estimated in excess of 1,000,000,000 board feet of high-quality timber was killed by fire. Damage to watersheds, reproduction, game, and forage was also very heavy.

Statistical data on the 1951 fire season to November 30, 1951, compared to same period in 1950, follow:

	<u>1950</u>	<u>1951</u>
Number of lightning fires .....	4,468	4,930
Number of man-caused fires .....	<u>5,268</u>	<u>5,300</u>
Total number .....	9,736	10,230
Number of fires exceeding 10 acres in size .....	1,266	1,281
Area of lands burned over inside the exterior boundaries of the national forests .....	322,895	394,771

Range Use. Grazing receipts for fiscal year 1951 went up to \$4,165,573, an increase of 20.1 percent over fiscal year 1950. About 80,000,000 acres of national forest land are grazed. To prevent over-grazing and



deterioration of the range, it was necessary to reduce permitted grazing use on the national forests from 8,089,000 animal-unit months in 1949 to 7,620,800 animal-unit months in 1950--approximately 6 percent.

Whenever reductions in grazing use are necessary, the Service has been pursuing a definite plan in meeting the problems of the range and the inevitable impact on the welfare of the stockmen and communities affected. Before the end of the season preceding the year in which proposed reductions are to take effect, it is the practice to offer affected stockmen permittees the opportunity of riding the range with local and regional forest officers in order that conditions may be inspected cooperatively and discussed on the ground.

The Forest Service has just completed a three-year study for the purpose of developing a system for measuring condition and trend of range land. This will have wide application on national forests as well as on private ranges, and may have some application on other Federal range lands. The study should serve as a valuable guide to administrators in determining the maximum use which can safely be made of range without deteriorating the forage cover or soil.

Last year the Forest Service and the Bureau of Land Management in the Interior Department agreed to coordinate grazing use on lands administered by the two agencies. It was also agreed that the two agencies should enter into cooperative agreements to improve management of the ranges. Where adjustments in stocking are made which affect both Forest Service and Bureau of Land Management lands, the problem will be considered jointly by the two bureaus.

During the past year the Department has placed special emphasis on areas on which the grazing problems are most acute. Many of these areas were examined, the decisions and methods employed by local Forest officers in making adjustments were reviewed by technicians and administrators not directly connected with the controversial areas or issues. These outside experts have also been called upon to review the range problems and inspect range conditions and vegetative readiness.

During the past two seasons a range conservationist attached to the Washington office has been devoting the greater part of his time to range inspection and educational work. He has been exploring the extent and progress of Extension Service range work and the possibilities for making research and other Forest Service information and management as helpful as possible in all cooperative work in this field, including the extension phase of range reseeding and the current grasslands program. The primary aim of this educational work is to help Forest officers to get better range-management practices into use on the ground and to build more effective relations with the Extension Service and other agencies interested in range.

Preparation of plans for carrying out the provisions of certain sections of the Granger-Thye Act of April 24, 1950, was undertaken and partially completed during 1950. Section 18 of the Act provides for establishment of forest advisory boards, and this necessitated preparation of a

new regulation, which was approved April 14, 1951. Before its adoption ample opportunity was afforded existing advisory boards, permittees (through their recognized livestock associations), forest officers, and interested representatives of the livestock industry, to review the new regulation and offer suggestions. Several hundred meetings were held by associations and advisory boards, with forest officers participating, to explain the proposed regulation and instructions and to make sure that whatever we issued would be generally understood and concurred in. Each advisory board was advised in writing of the reasons for not adopting or modifying any of their recommendations.

Maintenance of Improvements. The total estimated cost of maintaining the \$111,000,000 cost value in existing improvements on the national forests (exclusive of roads and trails) is \$4,458,087 as evidenced by the table which follows this paragraph. Funds obligated for maintenance in 1951 including Cooperative Funds were approximately 72 percent of this amount. Thus, the maintenance program was based on a relative priority selection of the most urgent projects such as key telephone lines, lookout towers, fences, etc. Even on these improvements, full maintenance was not given in order to spread the available funds over as many projects as possible. The inevitable deterioration of improvements because of inadequate maintenance is minimized by this procedure. Rising costs have also contributed to the backlog of maintenance work that is currently not being financed.

A tabulation of improvements in existence June 1951 is given below:

<u>IMPROVEMENT</u>	<u>No. of Units (Miles or No.)</u>	<u>Unit Costs</u>	<u>Total Annual Cost of Maintenance</u>
Telephone lines .....	50,438	\$15.93	\$803,762
Fire breaks .....	5,109	80.61	411,836
Airplane landing fields .....	69	200.00	13,800
Lookout houses, towers, and observatories .....	2,974	64.19	190,901
Pump sets .....	530	25.62	13,578
Dwellings:			
5 rooms or more .....	922	225.00	207,450
2-4 rooms .....	2,062	145.00	298,990
1-room cabins .....	1,366	45.00	61,470
Utility buildings:			
Over 1,000 sq. ft. ....	1,659	130.00	215,670
Under 1,000 sq. ft. ....	7,181	45.00	323,145
Offices .....	717	140.00	100,380
Camp and picnic areas .....	4,134	137.81	569,735
Winter sports areas .....	202	296.83	59,960
Recreational lakes and swimming pools .....	216	485.64	104,900
Dams, all types .....	282	77.30	21,800
Administrative water and sanitary systems .....	2,095	60.00	125,700
Fences .....	27,695	25.00	692,375



<u>IMPROVEMENT</u>	<u>No. of Units (Miles or No.)</u>	<u>Unit Costs</u>	<u>Total Annual Cost of Maintenance</u>
Gas and oil storage .....	103	53.14	5,473
Light, power, and central heating plants .....	208	62.26	12,950
Stock driveways, range (includes bridges) .....	3,571	12.00	42,852
Special use facility areas ...	584	25.00	14,600
Range water developments .....	15,287	10.80	165,160
Docks and miscellaneous .....	40	40.00	1,600
			<u>4,458,087</u>

Construction of Improvements. Funds obligated for construction in the fiscal year 1951 were used to take care of the most critical requirements for replacement of the existing plant of \$111,000,000, cost value, and for urgent additions to plant—primarily for housing. Priority generally has been given to housing for the lower-salaried forest officers headquartered in small communities and isolated locations where rental housing was not available.

Wildlife Use. Nearly every acre of national forest land in some way contributes to the production of wildlife resources. These resources include unestimated millions of small game animals, such as turkey, grouse, and squirrels, and large numbers of forest-inhabiting furbearers, such as beaver and marten. 2.6 million big game animals on the national forests comprise about one-third of the Nation's estimated population. A great variety of warm and cold water fish are found in the 81,000 miles of streams and over 1.5 million acres of lakes, ponds, and reservoirs.

The wildlife resources of the national forests are available to and enjoyed by the general public under the prevailing fish and game laws of the States. Since these lands are public lands and open to the people, they are visited by over five million sportsmen, including fishermen, numbering in excess of three million. Since these visits average about four days, it indicates a sportsman use of about 20 million man-days.

Hunter take has increased somewhat and is now 356,000 big game animals. This take is in part due to more hunters, but primarily through changes in State laws which permit the taking of either a buck or a doe under the either-sex law. Big game populations have not changed much in the last decade. However, in many instances the ranges are fully or overstocked and damage, especially to winter ranges, continues. Thus the Forest Service is faced with a long-time program of working out big game adjustments with the States and the sportsmen.

An increasingly important field of work is the coordination of water development projects on the national forests with the maintenance of fish life. Working with the States and the Fish and Wildlife Service, attention is given to including in Federal Power Commission permits



stipulations which will provide for maintenance of permanent minimum pools in reservoirs and the release of sufficient water below reservoirs and diversions to maintain fish life in the streams. This work is especially important in the western States.

Cooperative responsibilities are increasing in all areas of the national forest system. For example, in West Virginia, the State now has authority to collect \$1.00 from each fisherman and \$1.00 from each hunter who uses the national forests. The State then uses this money on cooperative work with the Forest Service in a very intensive wildlife management program.

Recreation Resource Management. During the calendar year 1950, public use of the national forests, exclusive of highway travel, amounted to 27,370,000 visits totaling 38,932,000 man-days' use. This is an increase of 5 percent over the 26,100,000 visits reported for 1949.

Visits to camp and picnic grounds, winter sports areas, and organization camps accounted for approximately 13 million visits.

Use of other national forest areas, such as resorts, summer homes, and wilderness areas, as well as the use made of the national forests for hunting and fishing, generally showed substantial increases over 1949.

Overuse, and the fact that practically no new areas have been developed since World War II, plus the deteriorated condition of many areas, are making the care, policing, and maintenance of the limited existing facilities more difficult and costly. Sanitation is a serious problem throughout the national forests and is aggravated by overcrowding. Inspections made by the U. S. Public Health Service and State sanitary inspectors show that national forest recreation areas are not satisfactory and should have better toilets, water systems, and garbage disposal. The Bass Lake recreation area on the Sierra National Forest in California was closed by the Forest Service upon the recommendations of the Madera County health officer. The area has subsequently been reopened but with strict limitations upon number of users.

Efforts are being made to obtain greater participation by local communities in the management of national forest camp grounds, and in increasing the number of concessionaire-operated installations, in order to reduce the burden of maintenance on the Federal Government.

Miscellaneous Lands Activities. Special use permits covering the use and occupancy of national forest lands for private, public, and semi-public purposes were held by 49,806 permittees as of June 30, 1951. Some 29,000 charge-permits produced a revenue of \$656,186 in fiscal year 1951. Between 6,000 and 7,000 permits are issued each year, as compared to 4,000 or 5,000 expirations or revocations. The demand for summer home lot permits, especially in California where there are several thousand unfilled applications, has exceeded the ability of the Forest Service to plan, locate, and survey such lots. There are 16,024 charge summer home lot permits in force and new permits are being issued constantly.

The percentage fee schedule for commercial public service special uses was revised as the result of a study made of resort operations. The new rates, effective January 1, 1951, are about 30 percent lower than the rates which were adopted in 1949. The study showed that many resorts were unable to show satisfactory profits on account of high investments, short seasons, and high costs of doing business.

Mineral Permits and Leases. Mineral permits and leases on acquired lands are now issued by the Bureau of Land Management, but the Forest Service is required by law to report on all applications and to consent to issuance of permits and leases. By law also, it is authorized to attach stipulations to its consent to protect the national forest or other land management resource functions. Examination of title and status records is involved and is a particularly time-consuming job. During last year approximately 500 cases required action. Receipts deposited to the Forest Reserve fund in fiscal year 1951 amounted to \$142,846. Some 630 leases covering around 700,000 acres are now in effect on national forest acquired lands.

In addition, the Forest Service reports on applications to lease minerals covered by the Mineral Leasing Act of February 25, 1920, on national forest lands reserved from the public domain. It is estimated that there are some 2,500 or more such leases in effect covering 3 to 3 $\frac{1}{4}$  million acres in the western national forests, the Lake States, Arkansas, and Mississippi. In addition the Forest Service has reported on some 1,500 to 2,000 new applications during the past two years. There has been a heavy increase in this activity in the last several years. Revenues from "public domain" national forest leases are not credited as national forest receipts, but are collected by the Bureau of Land Management. Estimated annual receipts from mineral leases on "public domain" national forest lands are \$2,000,000. Since lessees acquire certain occupancy and development rights under their leases, the management of the national forests becomes more difficult as other uses must be coordinated with the rights granted lessees. Particular problems arise from time to time where applications to explore for and develop oil and gas resources embrace lands set aside or used for special public purposes. Examples of recent problems are applications to lease lands in the California Condor Sanctuary and the Santa Ynez Watershed also in California. Special studies were made of both of these areas to determine whether they could be utilized for oil and gas purposes and still serve their principal function.

Mining Claims. Over 2 million acres of national forest land are covered by active mining claims. Many of these are interfering with the administration of the national forests and are impeding resource management. The forest Service examines all applications for patent of mining claims on national forest land to determine whether the law has been complied with. The Forest Service also examines claims which are believed to be invalid. Many of these cases involve mineral examinations and hearings of court action. The volume of this work has risen greatly in the last 2 years and now requires many man-years of work by mineral examiners, rangers, supervisors, and regional office personnel.



Land Exchange. Congress has passed 90 laws authorizing the exchange of national forest land and timber for private lands intermingled with or adjacent to national forests. During the fiscal year 1951, 179 exchanges were approved in which the United States will receive 135,421 acres valued at \$1,793,739 and will grant in exchange 52,731 acres of national forest land, and 70,557 acres of public domain in New Mexico valued at \$303,370 and \$181,866 respectively, and stumpage valued at \$1,084,344.

Mapping. For efficient national forest administration and management, reliable maps should be available for 363 million acres of national forest and intermingled or adjoining lands. Although Government-owned national forest lands total only 180 million acres in round numbers, these are frequently intermingled with other publicly-owned and private lands in a pattern roughly resembling a checker board. Mixed internal ownerships do not lessen the land area coverage which must be considered in planning fire protection, resource management, and road systems for the national forests. National forest map coverage areas are furthermore squared to fit the pattern of standard U. S. Geological Survey quadrangles. Consequently, the gross area which must be mapped in order to provide adequate coverage of the national forests is roughly twice the net area of national forest lands.

As of June 30, 1951, adequate maps for national forest purposes were available for 71 million acres.

Mapping to U. S. standards by the Forest Service is under way on 4½ million acres.

Mapping to U. S. standards by other agencies of lands within or influencing the management of the national forests is underway on 41,000,000 acres.

Preparation of charts showing drainage and road system patterns is underway on 25,000,000 acres.

No provision has yet been made for the 222,000,000 acres or 62 percent of the map coverage needed for the national forests.

Accomplishment by the Forest Service during the Fiscal Year 1951 was as follows:

Final field check was completed on map manuscripts for 270,000 acres in the Trinity National Forest in California.

Map manuscripts are the maps prepared, usually in pencil by the photogrammatrist and before being traced in ink for publication.

Field surveys completed and plotted on the manuscript for an additional 300,000 acres in the same forest.

Map manuscripts were completed for 1,150,000 acres in the Plumas National Forest and submitted to the U. S. Geological Survey for finished tracing and publication.



Manuscripts were completed on 280,000 acres on an area embracing parts of the Coconino and Tonto National Forests in Arizona.

Manuscripts of maps made by early-day ground methods were corrected on another 280,000 acres on Coconino and Tonto National Forests.

Charts were prepared showing drainage pattern and roads on 10,700,000 acres in other national forests in Arizona and New Mexico. The chart information is plotted to the same accuracy used in making standard maps and will therefore, be utilized in making U. S. Standard topographic maps as funds become available for that purpose.

Twelve million acres of national forest lands were covered by aerial photography for mapping or in order to facilitate resource management, all of the photography will be used ultimately in national forest mapping.

Watershed Management. Continuing emphasis is being given to minimizing erosion and accelerated runoff in carrying on regular field jobs such as (1) more engineering attention to location and design of logging roads and trails on cutting areas, (2) fitting of logging methods to slope and soil stability conditions, and (3) experimentation in cutting patterns in lodgepole pine areas to correlate timber and water resource management.

As a result of protecting a watershed source of municipal supply for Ogden, Utah, through inauguration of a cooperative land acquisition program, flows of six to seven cubic feet per second may now be cut into the city water system whereas flows in excess of one second-foot formerly were bypassed due to silt content.

Cooperation with the Bureau of Reclamation in erosion control above Shasta and Keswick reservoirs, California, is under way. A soil survey in Washington and Oregon on national forest roads is being undertaken to provide a basis for better correlation of construction and maintenance standards with the requirements for watershed stability.

## 2. Resource Development:

Reforestation. During fiscal year 1951, 25,576 acres were planted and seeded on the national forests. In addition, special measures were taken on 17,668 acres to assist nature in restocking land that otherwise would require artificial seeding or planting. Planting was concentrated largely in the Lake States, the South, and the Pacific Northwest. 12,534 acres of plantations were treated to eliminate brush and weeds competing with the planted trees. The two new nurseries in California and Oregon are now in production. In addition to the above, 20,545 acres were planted or seeded on timber sale areas. The latter was financed from the Cooperative Work fund.

Revegetation. During fiscal year 1951 about 60,000 acres were reseeded, bringing the total national forest acreage reseeded as of June 30, 1951, to about 400,000 acres. Reseeding results to date have justified an expected increase in grazing capacity of one animal-unit month for each

1.6 acres; hence the estimated increase in capacity of this reseeded acreage is 250,000 animal-unit months or approximately 55,000 head for a season of 4.5 months.

One example of range reseeding among many undertaken by the Forest Service is the Pine Project on the Dixie National Forest in Utah. This is the largest single reseeding project ever undertaken by the Forest Service. It is a 25,000-acre project located along the highway between Panguitch and Bryce Canyon. It was started in 1942 when 200 acres of abandoned farm land were planted to crested wheatgrass and smooth brome. In 1946 another 690 acres were reseeded. Both these plantings were very successful and increased the forage production by 500 percent. During the years 1948, 1949, and 1950, 24,400 acres of adjoining range land were reseeded. In addition to the wheatgrass and brome, some other species included in the later seedings were orchardgrass, timothy, and yellow sweet clover. These are not being grazed as yet, but are expected to be just as productive as the early projects.

Fighting Forest Fires

This appropriation covers emergency fire control expenditures on the national forests. Administrative restrictions placed upon the use of these funds by the Forest Service require that expenditures shall not be made therefrom until forest fires have actually started. An exception is made to this rule, however, when fire conditions become so critical that the regular protective organization, which is financed from the appropriation "National Forest Protection and Management," is unable to cope with the situation and when, therefore, the temporary employment of additional guards will clearly reduce expenditures for fire fighting.

For fiscal year 1951, \$6,000,000 was appropriated of which \$2,500,000 was reserved for emergencies. Primarily because of very large forest fires in California during 1950 it was necessary, by December 31, 1950, to obtain release of \$2,200,000 of the reserve. Drought conditions in Arizona and New Mexico resulted in very serious and costly forest fires in that region during the last half of fiscal year 1951. This made it necessary to obtain release of the remaining \$300,000 in the reserve. In addition, it was necessary to expend, in fiscal year 1951, \$591,429 more than the \$6,000,000 appropriated; this amount was charged to the appropriation for Forest Development roads and trails in accordance with provisions of law (31.U.S.C. 534) which authorizes advances of funds from other appropriations for fighting forest fires in emergency cases. Expenses incurred under such advances were subsequently transferred to the 1952 Fighting Forest Fires appropriation when it became available.

The severe fires in the summer and fall of 1951 have required expenditures in excess of the \$6,000,000 provided in the 1952 Agricultural Appropriation Act. These expenditures have been met temporarily from other Salaries and Expenses appropriations. The 1953 Budget contemplates a supplemental appropriation in 1952 of \$3,500,000 to meet these expenditures as well as to cover fire fighting costs for the remainder of the current fiscal year.



## FOREST RESEARCH

### Forest and Range Management Investigations

Current Activities: The Forest Service is the agency with primary responsibility for Federal research on forest and range lands, which make up 54 percent of the Nation's land surface. The object of the research is to develop improved techniques which will help to sustain and increase production of the renewable resources, timber, range and water, from these lands. The results of the research are used as a basis for the protection and management of the national forests and other Federal lands, and they are made equally available to States and private landowners throughout the Nation.

Functionally, research under this appropriation is broken down into that concerned with the growing and harvesting of timber products, the protection of forests from fire, the production and efficient use of range forage, and the management of both forest and range vegetation to produce the greatest amount of usable water and a minimum of erosion.

Organizationally, the work is carried on at 11 regional experiment stations in the continental United States, at 1 in Puerto Rico, and at a research center in Alaska. These stations serve the major forest and range regions into which the United States is divided. Much of the research is concentrated on experimental forests and ranges representative of major problems. These experimental areas of several hundred to several thousand acres each are either federally owned or under the control of the Forest Service through leases or written agreements. On them are performed the experiments basic to proper management and protection of forest and range lands, and the practicability of the methods discovered is tested.

The demand for research in these fields does not fall alone on the Federal Government. The program is to a large extent a joint endeavor between Federal, State, and private interests. The capital value of lands, timber, and other facilities made available by cooperators to the Forest Service now represents a capital value of 5.6 million dollar.

In accordance with the request of the House committee on appropriations in its report on the 1952 Agricultural Appropriation Bill, the Department has submitted a special report on cooperation in Forest and Range Management Investigations.

Research in forest management is emphasizing determination of methods for quickly increasing the growth rate of forests and hence the permissible annual cut. Also emphasized are cost and return studies to determine the tree sizes, stand volumes, and equipment that will provide for most efficient use of manpower and equipment without damage to productive capacity of the forest resource. Comparisons of the more promising combinations of important factors are tested on a practicable operating scale. Also being stressed separately and in combination with the above are cultural measures leading to control,

by means of chemicals, prescribed burning, and otherwise, of undesirable vegetation competing with crop trees. Methods of reforesting abandoned farm lands, stripped mining lands, and burned-over forests, are being improved through research. The development of hybrid trees for faster and more certain timber production is being studied, as well as improved methods for stimulating gum flow in pines for the production of rosin and its derivatives.

Range research is aimed at obtaining greater values from the range resource by increasing forage on land now producing below its potential, by grazing in a manner that will sustain this production, and by producing more meat, hides, and wool at a lower cost. On some badly deteriorated ranges where natural recovery under good management would be extremely slow, range reseeding research has laid the foundation for successful improvement programs. Continued research on what, how, when, and where to seed, and how to graze these reseeded stands, will bring similar success to other ranges. The control of noxious and poisonous plants, especially undesirable shrubs, on range lands is being studied to find how they can be substantially reduced and replaced with valuable forage plants. One of the pressing problems is the control of halogeton, an extremely poisonous plant invading range lands in the Intermountain region.

Investigative work in the protection of forest, range, and watershed lands from fire is directed toward reducing losses from fire and toward better efficiency in application of fire control measures. Successful management of these lands for their most productive use can be accomplished only as uncontrolled fire is excluded. The fire problem with which this activity is concerned is important to civil and military authorities as well as to land managers because of the serious threat to other values and activities by the 200,000 forest and range fires that occur every year. The use of wetting agents and chemicals to improve the efficiency of forest fire fighting is being given field trials this year; the investigation of unexpected behavior of big fires is getting special attention, improved action through use of airplanes and helicopters is being studied, and some exploration will be continued on possibilities of reducing the severity of fire-setting lightning storms.

Watershed management research is directed toward improving soil and cover conditions and practices to alleviate flood and sediment problems arising out of past land use, and toward helping meet urban, rural, and industrial demands for water of good supply and high quality. Watershed use problems are attacked by obtaining quantitative measurements of the effects of such activities as fire, logging, hill-farming, grazing, and road construction on water supply and quality. Concurrent with these studies are those to determine how to use watersheds for various economic purposes and still provide satisfactory supplies. Possibilities of increasing water yield through the adjustment of forest cutting practices are being studied. Particular attention is being given to the effects of watershed use and management as they are reflected in soil water relations. This provides both an understanding of the results of given effects and a means of predicting the magnitude of such effects on other areas.



Selected Examples of Recent Progress: Artificially pruned Douglas-fir trees begin to produce clear lumber much earlier than unpruned trees. Branch stubs persist as knots for as long as a century in unpruned trees, whereas artificially pruned branches of second-growth trees 30 to 50 years old healed over in about 10 years and from then on clear lumber was formed. The investigation uncovered no evidence that pruning left wounds that were infected by decay fungi. Fast-growing trees healed over more rapidly than did slow-growing trees. A further study indicates that in the neighborhood of 45,000 acres per year should be artificially pruned every year in the douglas fir region to provide the volume of high grade logs needed to sustain plywood production at current levels. Under these conditions the pruning of douglas fir timber would be highly profitable.

The 33-million-dollar salmon industry appears to be in no jeopardy through the utilization of Alaska's timber reserves. An examination of 30 Alaskan salmon streams that had been exposed to logging disclosed no evidence that they had been destroyed for spawning. All streams that accommodated salmon before logging still support spawning.

A guide has been developed for salvaging timber from fire-swept forests of the Southwest. Trees that will survive after a forest fire can now be distinguished from those that are injured beyond recovery. These findings will put salvage operations on a scientific basis and will eliminate the need of costly resalvaging of burned-over areas.

Given proper management, the bottomland hardwoods of the South are capable of producing more than 7 billion board feet of excellent timber every year. As the result of past work at the Southern Experiment Station, a guide for the management of these types is now available. This guide summarizes and classifies all the important variations in the bottomland hardwoods and recommends cutting procedures most appropriate for them.

Application of 2, 4-D solutions are producing about the same yield of gum as sulphuric acid for the first two years of working on slash pine. Usable methods of prolonging the flow of gum by sulphuric acid are now available to the naval stores industry as the result of past research. These methods saved the industry about one-half million dollars in 1950. The new chemical, however, is safer and easier to use than sulphuric acid.

Successful harvesting of the Engelmann spruce forest of the Rocky Mountains has been simplified. A hitherto little understood forest type has been classified by condition classes that make it possible to prescribe appropriate cutting methods for each class. A timber resource once held as a reserve can now be made to contribute additional revenue to the Federal Treasury without jeopardizing its productivity.



A farmer selling logs from his woodlot at the roadside would obtain twice as large a net return as from felling stumpage alone, according to a study in Lower Michigan. This net return for profit, risk, and interest on his woodlot investment is in addition to his wages. By scheduling his timber cutting as an off-season job, his total farm income can be increased.

The results of 40 years of research in the Southwest have been summarized in a handbook. Information in this handbook includes cutting practices for optimum growth, methods of regenerating forests both artificially and naturally, and tables of growth and yield necessary for sustained-yield management. In a concise form, this handbook provides the answer to how the forests of Arizona and New Mexico can be made to furnish maximum quantities of lumber.

Changing from two-man to one-man power saws effects a substantial saving in felling and bucking white pine trees. On the Massabesic Experimental Forest in Maine it reduced the time required per thousand board feet of logs by one to one and a half man-hours. This held through all tree sizes studied. Shifting from two- to one-man power saws is a sure way of stepping up production and of partly solving the labor shortage problem in the woods.

Reforestation is possible for most of the 190,000 acres of strip-mined coal lands in the midwestern States. In Indiana 26 coal company plantations from 15 to 24 years old were examined by the Central States Station. Hardwood mixtures on moderately acid spoil banks have grown an average of 1.5 feet in height per year. This growth compares favorable with that of trees in forested stands.

Tree breeding research has developed new hybrids of outstanding performance. A back cross—a straight cross followed by a cross between a hybrid and one parent—of Jeffrey pine and Coulter pine has been produced that shows a greater capacity to survive in plantations than its parents. A hybrid of Jeffrey pine and Coulter pine has been produced that is more vigorous than the back cross and gives indications of also being still more resistant to the pine reproduction weevil than the back cross. Crosses between American white pine and Asiatic white pine show greater resistance to blister rust than crosses between American species.

A method for determining age in the virgin rain forest of Puerto Rico is now in sight. The new method is based on a mathematical relationship of growth with time in place of the customary technique of counting rings which has proved unreliable with tropical trees. This approach will simplify one perplexing problem in the estimation of timber growth in the Caribbean.

Fifteen years after planting, there were no real differences in the development of jack pine trees grown from the seed of cones from 1 to 15 years old. These results from a study initiated in northern Minnesota in 1935 are important, since a large part of the area needing reforestation in the Lake States is best adapted to this species. A cheap and plentiful supply of seed is essential to an economical planting program.

Use of water in forest fire fighting. The trend is toward more use of water as accessibility of forest areas by road increases and as water-using equipment better adapted to forest fire fighting becomes available. Tank trucks were used on 22 percent of all fires on the national forests in 1950 and on 21 percent in 1949. Most State protection organizations use water on a much higher percent of their fires because of better accessibility. At the California Station the Fire Research group produced a training manual for fire crews that utilizes special techniques of presentation for the benefit of the average fire crew member. These combine technical knowledge of research men with the know-how of experienced fire fighters in a publication which is entitled "Water vs. Fire." This has immediately become a "best seller" among Forest Service publications.

Use of wetting agents in fire fighting. The study of the use of wetting agents to increase efficiency in forest fire fighting has made further progress in the last year. To take full advantage of wetting agents, skilled technique in the application of water in fire fighting is required. Special equipment is being developed that will permit the use of wetting agents at will when water is being applied in the control of fires. The value of more skillful use of water, and the potential increase in its effectiveness through wetting agents, have both been demonstrated by research. Together they offer promise of significant progress in efficiency in reducing fire costs and losses.

Analysis of fire statistics. A study has been completed for the Northern Rocky Mountain Region which represents perhaps the most comprehensive analysis of forest fire statistics that has yet been carried out. The analysis establishes guidelines for future planning and policy for forest fire control in that region and establishes many new facts that were not previously known. The value of this work, which is described in a publication entitled "Forest Fires in the Northern Rocky Mountains" issued in April 1951, will be reflected in many phases of performance by the administrative organization as well as in other projects in fire research.

Forest fire behavior. Although much has been learned about forest fire behavior through research, the review of large fires conducted each year has demonstrated that much of this knowledge is not applied by fire fighters on the ground. An endeavor to make sure that results of research are put to use is being made, which will take the form of well-planned printed manuals for the fire fighter, as well as for the technician. The first product of this work consists of a nontechnical training guide entitled "A training course in fire behavior"; the second is a manual issued in May 1951 for the Northern Rocky Mountain Region entitled "Fire Behavior in Northern Rocky Mountain Forests." A comprehensive manual for useful reference to all fire fighting agencies is also planned.

Crested wheatgrass is a high producer when seeded on the drier depleted range lands. Cooperative grazing tests which have now extended over a number of years show the value of reseeding depleted range lands to crested wheatgrass. A 46-acre area at the



U. S. Range Livestock Experiment Station, Miles City, Montana, for example, has produced an average of one cow-month and 80.5 pounds of beef per acre per year for the past 11 years under spring and early summer grazing. This is 2.8 times more beef than is obtained from native range forage in the same area. Rainfall there has averaged 14 inches a year. At the U. S. Sheep Experiment Station, Dubois, Idaho, with 11 inches average rainfall, each acre of crested wheatgrass has averaged 5 sheep-months of early spring and fall grazing per year for 10 years. During this period it has furnished forage an average of 2 weeks earlier than native range plants. Near Ephraim, Utah, a range area with 12 inches annual precipitation has produced 5.8 sheep-months per acre per year of spring and fall grazing for 8 years. Before seeding, this area was so depleted that it had practically no grazing value. Twenty rather large areas of typical reseeded crested wheatgrass range, totaling 14,000 acres in Idaho, Utah, and Nevada, have furnished from 300 to 1,700 pounds per acre of air-dry herbage. Grazing capacities from these areas have been from  $2\frac{1}{2}$  to 10 times greater than comparable depleted and unseeded range. Annual rainfall at these areas varies from 9 to 20 inches, with half of them having 12 inches or less each year.

Good reseeded grasses produce 15 to 20 times more than native grasses on depleted big sagebrush range land. New introduced wheatgrasses—intermediate, pubescent, and tall wheatgrass as well as crested wheatgrass—all yielded from 1 to  $1\frac{1}{2}$  tons of air-dry herbage per acre when sown on a big sagebrush range area near Gunnison, Colorado. Before seeding, the sagebrush was killed by disc plowing. Native grass on an untreated plot produced only 140 pounds of herbage. Experience with such areas has been that many years would be required for such low-producing land to make appreciable increase in forage production, without reseeding, even under good range management.

The Forest Service brushland plow removes big sage brush from range land to be reseeded for almost half previous cost. Some of the more favorable sites for range reseeding in the West have been taken over by big sagebrush and now produce very little palatable forage. Heavy disc plows and other discs designed primarily for cultivated farming operations break and cause lost time when used on these rough, rocky range lands. Through research and experimentation, the Forest Service has developed the brushland plow which greatly reduced breakage. As a result of its more efficient design and operation, the brushland plow removes big sagebrush more effectively and at about half the previous plowing costs. One of the main features of this plow are paired discs mounted on an arm with spring tension so that each pair will raise over rocks, stumps, and piles of brush without affecting the operation of the other discs and without undue strain on the plow. The brushland plow can be operated with less tractive power than lighter farm plows and discs with the same width of cut. This plow, now available for commercial production, will greatly reduce reseeding costs and further encourage improvement on millions of acres of range land throughout the West.

Mesquite control may double the amount of grass on mesquite-infested range land in the Southwest. Mesquite invasion in the Southwest constitutes a serious range problem. Mesquite now occurs on some 70



million acres and is continuing to spread and thicken in abundance, often in the choicest grassland areas. Well-established but even light stands of mesquite offer serious competition to grass for soil moisture, cause a reduction in the grass stand, adversely affect forage yields, and increase erosion. This is especially true on drier range areas where average annual rainfall is about 14 inches. Where mesquite was killed by oil treatment, density and yield of the perennial range forage grasses were double that of untreated range within three years. Control on light to moderate stands of mesquite is practical with diesel oil or sodium arsenite, with costs for chemical and labor averaging about 4 cents per plant. These control costs, even with 100 plants per acre, can generally be liquidated in 9 or 10 years by the increased range forage and livestock production.

Deer compete with cattle for forage in summer on central Utah ranges. Studies at Oak Creek in south central Utah showed that cattle used about 52 percent of the summer range area, mostly the more accessible parts. Deer used 92 percent including steep slopes and avoided only ledges and barren areas. Cattle and deer often preferred the same readily accessible range areas. In general those heavily used by cattle were also heavily used by deer, resulting in overgrazing. There were, for example, 86 deer-days of grazing per acre per year in the juniper-bitterbrush-sagebrush type which is also a favorite cattle grazing area. Such a number of deer-days of grazing would fully utilize the forage without any cattle grazing. This points to the necessity in range management for limiting and coordinating the stocking by both deer and livestock to prevent deterioration in the range resource.

Special study developed guides for range and watershed management of large range unit. A special one-year study on the Roosevelt National Forest in Colorado was completed during the past year. The character of deterioration on critical range and watershed lands and possibilities and values of recovery were evaluated. The study served as an example of how research findings can be applied to managing a large range unit on a practical basis.

A newly developed and readily usable method measures whether ranges are improving or declining. The three-year study to develop a method for measuring trend in range condition of national forest ranges has been completed. By periodic future remeasurements a reasonable reliable estimate can be made of improving or declining forage condition and erosion hazard.

Vegetation delays melting of ice in alpine meadow. Ice and frozen soil has been found until early fall at and above timberline in the Rockies, at depths from 7 to 40 inches below the surface. The gradual melting of this ice during the summer aids in sustaining stream flow. A mat of vegetation in alpine meadows insulates the soil and prevents rapid melting of soil ice. A rich organic or peaty layer such as found in marshy areas or wet meadows is best. Research shows that denudation through overgrazing and gully erosion which drains and causes a warming of the soil results in

an earlier release of the water stored as soil-ice. It is further shown that restoration of water tables by natural means, the installation of gully "plugs," and more conservative grazing practices will aid in delaying the melting.

Southwestern granitic soils require careful management. Eroded slopes of small watersheds in this area have not revegetated naturally after 23 years of complete protection from grazing animals. Thus the vegetation cannot be abused and then restored by protection except over an extremely long period. The slow recovery of vegetation demonstrates the need for eliminating all forms of abuse on areas in good condition and for aid in restoring deteriorated areas through reseeding or other revegetative measures, and through the use of structures.

Mustard best plant for burned areas. Because of certain deficiencies of black mustard, such as its short life, trials of 26 different species of grasses and other plants offering promise for quickly reclaiming fireswept and denuded chaparral watersheds in southern California were undertaken. At the conclusion of the tests it was revealed that black mustard still remains the best species for the purpose. The seed is very light, scatters well, germinates quickly, forms a ground cover within a few days, develops a considerable root system, provides considerable litter at the end of a season, and gives way to more desirable plants in a short time. Other species, although having more desirable characteristics such as forage value, greater persistence, ability to withstand drought, and deeper rooting, did not supply as good a cover as quickly. Erosion and runoff from mustard-sown areas was only a fraction of that from those sown to other plants.



## Forest Products Investigations

Current Activities: The forest products research program is now aimed at providing to the extent possible the research results and technical services required by the defense agencies, industries and others for the production, procurement, use, protection, modification, and conversion of forest products during the emergency.

Selected examples of recent progress are:

Skip spacing of diagonal wall sheathing for houses saves materials and reduces costs. Sheathing strips nailed diagonally across studding were spaced about 2 feet apart, and vertical siding was nailed directly to them. Wall sections thus built with studs spaced 24 inches on center—conventional practice calls for 16 inches on center—were found amply strong. It is estimated that, in a house with 1,000 square feet of floor area, such spacing of sheathing boards saves 80 percent on sheathing lumber, or about 1,000 board feet. In addition, about 35 pounds of nails are saved.

High-quality bond paper can now be made from mixed hardwoods. Extensive stands of second-growth hardwoods constitute a challenge to the paper-making industry. The long-fibered softwoods, so long the principal source of raw material, have become scarce and costs of transporting domestic pulpwood high. Imported pulps are costly and uncertain as to supply. In many cases good forest management indicates the desirability of removing existing hardwoods to make way for species of proved economic importance. Obstacles to the use of hardwoods have been the awareness that different pulping methods would have to be used and fear that it would be necessary to pulp each kind of wood by a separate process. A pulping procedure was worked out which is applicable to a characteristic regional mixture of nine hardwoods. A bleached semichemical pulp was produced of a quality satisfactory for use in considerable amounts in high-quality bond papers. One company has acquired rights to hardwood timberlands supplying hardwoods of the type tested and has under construction a new semichemical pulp mill designed to produce this bleached semichemical pulp. At least three other plants are known to be under construction and several others are contemplated.

Fiber boxes can now be designed on sound engineering principles much the same as are wood boxes. The variables in the design formulas include the strength of the fiberboard of which the box is made and the influence of scoring, printing, and similar factors on this strength. With these data and the atmospheric moisture conditions under which the box is to perform, along with load and stacking requirements, and duration of storage, fiber boxes may now be scientifically designed. Heretofore, it was largely a cut-and-try proposition, often resulting in over-strength with consequent waste of material, or under-strength with resulting loss and damage.

Small sawmill instructional package helps to reduce wasteful and uneconomic practices. A package course, developed by the Forest Products Laboratory, has been made available to those engaged in



the program designed to improve the efficiency of small sawmills. This course consists of lecture material and lantern slides showing complete sawing procedure for whole logs. Field trials of the package have been enthusiastically received.

Warping of Parana pine due to compression wood. Large quantities of Parana pine are coming into the United States market from South America in the form of wide clear boards. The wood normally has uniform texture and machines smoothly. However, serious warping occurs in some boards. Frequent requests come from industrial users for information on the kiln drying and cause of the warping defect and means for its control. It was determined the warping is caused by compression wood. Publications have been issued which facilitate the detection of compression wood in both rough and planed lumber and make it possible to sort for material free of compression wood.

The use of unbarked shortleaf pine in sulfate pulping shows considerable promise. There are several reasons why it would be desirable to use unbarked wood in pulp production provided the resulting paper met all use requirements. Barking costs would be eliminated, longer wood storage periods would be possible before the pulpwood would dry to the moisture content at which decay occurs, and larger net yields of pulp might be obtained. Tests were made in which shortleaf pine chips containing 8, 16, and 24 percent of bark were converted to kraft pulps of the sort suitable for brown wrapping paper, paper bags, and numerous other important uses. Up to 16 percent of bark (10 percent is believed to be a typical amount on pulpwood), the strength of the pulp was as good as that of pulps made from barked wood. Even with 24 percent of bark, bursting strength of the resulting paper was reduced only 8 percent. On the basis of the tests, an unpeeled cord of wood with 10 percent of bark would yield 5.4 percent more pulp than the same wood if it were peeled.

Instrument developed to determine the smoothness of veneers. In quality control work on veneers and in evaluating veneer from untried species, it is highly important to be able to make accurate measurements of smoothness. The Laboratory has developed an instrument that measures veneer roughness to the thousandth of an inch.

Color reactions found to be clue to lignin structure. Spectroscopic examination of color produced by the action of strong acids on wood has indicated that the color which develops is due in part to a material present in the lignin which can be identified. Fundamental studies of the structure of lignin such as these are part of the attack on the waste of millions of tons of this material in the chemical wood-processing industries. So far empirical work on the utilization of lignin has not shown the way to large-scale economical utilization.

#### Forest Resources Investigations

The objective of these investigations is to determine the amount and kind of forest land and timber resources in the United States, and

possible solutions to economic problems of ownership, production, marketing, etc., associated with management and use of the Nation's timber resources.

Status of Program: Field work on the Nation-wide survey of forest resources in fiscal year 1951 covered about 10 million acres of forest lands in areas never before surveyed, and 19 million acres in areas first covered during the 1930's. The initial surveys of timber resources were concentrated in California, Indiana, Kentucky, Tennessee, Pennsylvania, Maryland, and New York. Resurveys were made largely in the important timber growing states of Oregon, Washington, Idaho, Michigan, Arkansas, and Florida. Since 1945, up-to-date information on forest area, timber volumes, growth, and drain have been obtained for 126 million acres of previously unsurveyed forest lands, and 120 million acres have been covered by reinventories to determine actual changes and trends in forest conditions.

Basic facts on timber resources obtained in these surveys are contributing to both emergency and peacetime programs. Results were published in approximately a hundred reports and bulletins, in numerous technical articles, and in a large volume of correspondence with forest industries, Government agencies, and others. In connection with the program for accelerated tax amortization under the Defense Production Act, the Survey has provided basic facts for determining the availability of timber for more than 150 proposed expansions in pulp and other forest products industries. The decrease in saw-timber stands in the United States and need for more intensive wood utilization in all parts of the country have intensified the need for Survey statistics as a guide for wartime industrial development.

Cooperation with State and local agencies continued to make possible local intensification of the Survey and the compilation of important related information. In California, for example, State cooperation has entailed intensive mapping of vegetation types and of forest soils as a basis for action programs of State and local forestry agencies, tax assessors, and others. In New York, Pennsylvania, Michigan, and various other States, increasing State and local assistance is being received to intensify or accelerate the Forest Survey in order to provide basic facts for industry and government.

A number of special studies also were conducted during the year, many to provide information needed in the defense program. For example, reports for the Munitions Board include an appraisal of the current situation and outlook for domestic tannin materials and the supply-requirements situation for imported cork and cork products.



(b) Forest Development Roads and Trails

Appropriation Act, 1952.....	\$13,000,000
Budget Estimate, 1953.....	<u>13,000,000</u>
Change.....	<u><u>      </u></u>

Note: Although no change is shown in direct appropriation, there will actually be a decrease of \$3,569,420 in total funds available due out to the availability of prior year balance of \$3,569,420 in fiscal year 1952.

PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase or Decrease	1953 (estimated)
1. Construction of roads and trails...	\$3,999,962	\$8,419,420	\$2,919,420	\$5,500,000
2. Maintenance of roads and trails.....	7,318,149	8,150,000	-650,000	7,500,000
Subtotal.....	11,318,111	16,569,420	-3,569,420(1)	13,000,000
Total pay adjustment costs.....	[--]	[462,500]	[-34,500]	[428,000]
Total available or estimate.....	11,318,111	16,569,420	-3,569,420	13,000,000
Prior year balance available.....	-900,031	-3,569,420		
Balance available in subsequent year.....	+3,569,420	--		
Transfer from "Control of Forest Pests, Department of Agriculture".....	-250,000	--		
Transfer in 1952 estimates from "Salaries and Expenses, Forest Service".....	-94,900	--		
Transferred in 1952 estimates to "General Services Administration".....	+5,400	--		
Total appropriation or estimate.....	13,648,000	13,000,000		

DECREASES

(1) Decrease of \$3,569,420 on a total available funds basis because of balances carried over from 1951 in the fiscal year 1952.

In view of the necessity of maintenance of existing roads and trails which it is estimated will require \$7,500,000 from this appropriation in 1953, the reduction of \$3,569,420 will be applied against construction funds in the amount of \$2,919,420, and against maintenance funds in the



amount of \$650,000. The balances carried forward into 1952 were due primarily to the carry-over of funds provided late in the fiscal year 1951 by the Third Supplemental Appropriation Act, 1951, approved June 2, 1951. The access roads construction work and the repair of National Forest roads and bridges in Northern California damaged by floods in the fiscal year 1951, for which the supplemental funds were provided, are being completed in the fiscal year 1952.

#### CHANGES IN LANGUAGE

The estimates include a proposed change in the language of this item as follows (new language underscored, deleted matter enclosed in brackets):

For expenses necessary \* \* \* Provided, That this appropriation shall be available for the rental, purchase, construction, or alteration of buildings necessary for the storage and repair of equipment and supplies used for road and trail construction and maintenance, but the total cost of any such building purchased, altered, or constructed under this authorization shall not exceed \$15,000, (\$22,500 in Alaska), with the exception that any building erected, purchased, or acquired, the cost of which was \$15,000 or more, may be improved within any fiscal year by an amount not to exceed 2 per centum of the cost of such buildings certified by the Chief of the Forest Service.

The change in language is proposed to increase the building limitation in Alaska from \$15,000 to \$22,500. As explained under "Changes in Language" for the Salaries and Expenses item, 50 percent differential for Alaska is required to meet the higher costs which prevail in that area. An occasional repair shop and warehouse is necessary for the repair and storage of equipment used in the construction and maintenance of roads.

# STATUS OF PROGRAM

The appropriation for forest development roads and trails in the fiscal year 1951 was \$13,648,000 including \$3,300,000 provided by the Third Supplemental Appropriation Act, 1951. During the year, \$7,318,149 was obligated for the maintenance of about 89,035 miles of roads and 127,283 miles of trails.

During the year, \$2,522,299 was obligated for the construction and reconstruction of 252 miles of timber access roads; \$211,325 was obligated for relocation and construction of 183 miles of forest protection trails; and \$1,266,338 was obligated for the construction of 38 bridges on new roads and the replacement of 433 worn-out, unsafe bridges. Bridge replacement will continue to be a major item of work for many years to come; there are over 8,000 timber bridges built by the Civilian Conservation Corps on the forest road system which are rapidly wearing out and becoming unsafe for further use.

Work estimated to cost \$800,000 was started on the repair and restoration of roads and bridges damaged by severe storms in California in the fall of 1950. Approximately \$150,000 was obligated for this purpose in 1951, and the balance of \$650,000 in fiscal year 1952.

In the fiscal year 1951, \$7,318,149 was obligated for maintenance of the existing transportation system as follows:

Roads existing .....	107,731 miles	
Maintained by cooperators .....	<u>18,646 miles*</u>	
Maintained by Forest Service .....	89,085 miles ...	\$5,879,293
Trails all maintained by Forest Service ..	127,283 miles ...	<u>1,438,856</u>
		7,318,149

In addition, \$3,999,962 was obligated for construction:

Road construction and reconstruction of an average of only 1-2/3 miles on each national forest .....	252 miles ...	2,522,299
Trail construction and reconstruction .....	183 miles ...	211,325
Bridge construction on new roads and replacement of old bridges .....	471 bridges	<u>1,266,338</u>
		3,999,962

In addition to the above, \$3,360,039, representing 10 percent of national forest receipts, was appropriated in 1951 pursuant to the Act of March 4, 1913 (16 U.S.C. 501) for construction and maintenance of roads and trails in the forests within the States from which such proceeds were derived.

\* Estimated.

Status of Development Road and Trail System

	<u>Percent</u>	<u>Miles</u>	<u>Estimated Cost to Complete</u>
<u>DEVELOPMENT ROADS</u>			
Satisfactory Standard .....	34	49,522	---
Unsatisfactory Standard .....	41	58,209	\$223,181,000
Nonexisting .....	<u>25</u>	<u>36,076</u>	<u>396,767,000</u>
Total .....	100	143,807	619,948,000
<u>TRAILS</u>			
Satisfactory Standard .....	67	92,309	---
Unsatisfactory Standard .....	26	34,974	6,728,000
Nonexisting .....	<u>7</u>	<u>9,660</u>	<u>7,000,000</u>
Total .....	100	136,943	13,728,000
Total for Development Roads and Trails .....			<u>633,676,000</u>



(c) Smoke Jumper Facilities

Appropriation Act, 1952 .....	None
Budget Estimate, 1953 .....	\$970,000
Increase (for smoke jumper headquarters).....	<u>+970,000</u>

PROJECT STATEMENT

Project	:	1951	:	1952	:	Increase	:	1953
	:		:	(estimated)	:	or	:	(estimated)
	:		:		:	Decrease	:	
Construction of smoke	:		:		:		:	
jumper headquarters	:		:		:		:	
and air cargo supply:	:		:		:		:	
base.....	:	- - -	:	- - -	:	+\$970,000(1)	:	\$970,000

INCREASE

(1) An increase of \$970,000 for the acquisition of land and the construction of facilities for fire control operations at Missoula, Montana.

Need for Increase: Public Law 198, approved October 24, 1951 authorizes the acquisition of land and the construction thereon of buildings and appurtenances essential for forest fire control operations of the Forest Service at Missoula, Montana. These buildings are to be constructed to house the personnel and equipment of the smoke-jumper unit stationed at Missoula, Montana. The present quarters and facilities are so inadequate, and afford so little protection from fire to the irreplaceable equipment stored therein, that the need for the new buildings is urgent.

At the present time the physical plant used by the smoke jumpers stationed at Missoula consists of the following:

Training headquarters. Camp Monard, on national-forest land, is located 32 miles from Hale Field in Missoula, Montana. It is an inadequate county airport which the Forest Service is forced to use as the best under the circumstances. The Camp Monard headquarters consist of old temporary Civilian Conservation Corps barracks, inadequate from a public-health standpoint as well as space and safety to occupants. It is fully depreciated. It is too far from the airport to use during the active fire season. Men must be housed closer for the quick action essential.

Barracks. Because of the remoteness of the training headquarters from the airport, other barracks are rented during the fire season within 2 or 3 miles of the airport. Continued tenure is very uncertain.

Parachute loft. This federally owned building is located on land leased at the Hale Field airport, which is county land. It consists of old CCC frame structures and is used for reconditioning and packing

parachutes and repairing other equipment; for storage of irreplaceable, especially constructed jumping gear; for suiting up; and for dispatching action, which includes briefing each crew, providing maps, etc. It is extremely congested and is a critical fire risk. It is so inadequate that duplicating facilities in part are maintained at the training headquarters, and also at the summer barracks.

The fire equipment warehouse used to store and repair fire equipment the past 17 years is no longer available. The lease was cancelled by the owner. There are no other adequate warehouse facilities in or near Missoula, Montana, that may be leased for this purpose.

Hale Field, from which the Forest Service is now operating, is on county-owned land. It is immediately adjacent to a growing residential area, which has expanded up to it, from the city of Missoula. It is unlighted, has short gravel runways, and is dangerous for large aircraft because of the proximity of hills and structures. The Army will not land C-47 or larger airplanes at this field. This creates a serious problem from the standpoint of fire control since the Army cooperates by furnishing air transportation after all contract planes are in use. Repeated efforts have been made to have this field abandoned in the interest of providing more residential area. The Forest Service's tenure there is very uncertain.

The appropriation recommended in this estimate would provide for the construction of new physical improvements at the municipal airport 5 miles from Missoula. This airport has surfaced runways 7,000 feet in length, is equipped with lights permitting the pre-dawn and after-dark use so essential to effective fire action. It is adequate for the use of any size aircraft used, and is ideally located.

The proposal would locate in one place a consolidated headquarters for all aerial activity associated with forest fire control. It would assure security of tenure, training facilities, adequate housing, warehousing, servicing, efficient dispatching, communication control, and airport facilities and would permit much more efficient handling of those concentrations of fires which occur particularly in critical fire years. It would prove a base, subject to quick expansion should a national emergency occur. This project has been of assistance to the military in the past, and conceivable it could also be in the future.

#### THE PROPOSED PHYSICAL PLANT

Dormitory for 100 men .....	\$220,000
Parachute loft .....	130,000
Residence for foreman .....	15,000
Site acquisition .....	2,000
Taxiway to main air strip .....	54,000
Sewer, water, power, heat, etc. ....	89,000
Hanger for Government planes .....	67,000
Fire equipment warehouse .....	<u>393,000</u>
Total .....	<u>970,000</u>

The construction of the fire equipment warehouse listed above would make it possible to reduce the amount of space at the Spokane warehouse, and would result in a reduction of rental and transportation costs of approximately \$21,000 annually.

The smoke-jumpers unit at Missoula was organized to reduce the elapsed time between discovery and initial attack on fires in the inaccessible areas within the Region. The largest body of roadless, forested area in the country is located immediately south and southwest of Missoula. Other large roadless areas are located to the east, northwest, and north of Missoula. While the personnel of this unit are available for action on fires outside the Region, their primary function is to combat fires in the inaccessible areas of the Region. Missoula is the most centrally located city with an adequate airport.

Plan of Work: The first step in the completion of this project would be the negotiation of a long term agreement with the county for the use of the airport and airport facilities as required by the Act of October 24, 1951.

The second step would be the acquisition of 70.25 acres of land from the county upon which to construct the improvements listed above. State laws of Montana preclude the possibility of the county donating land adjacent to the Municipal Airport to the Forest Service. However, the county is willing to sell 70.25 acres to the Forest Service at a nominal price (estimated at \$2,000). The county is willing to consider a friendly condemnation suit to avoid speculative bidding by a third party if the land was offered for sale.

Practically all of the improvements will be constructed by contract.

#### CHANGE IN LANGUAGE

The estimates propose the following new appropriation item:

For expenses necessary for the establishment of facilities for forest fire control operations pursuant to the Act of October 24, 1951 (Public Law 198), \$970,000, to remain available until expended: Provided, That hereafter the authorization granted in section 3 of said Act to enter into contracts for the foregoing purposes shall not be exercised.

The proposed language would provide for the acquisition of land and the construction thereon of buildings and facilities essential for forest fire control operations of the Forest Service at Missoula, Montana, as authorized by Public Law 198, approved October 24, 1951. The land to be acquired is adjacent to the new Municipal Airport at Missoula.

Public Law 198 contains the following proviso:

"Provided, That the Secretary may, prior to July 1, 1953, enter into contracts for the acquisition of the land and for the construction of the buildings and other installations herein authorized, to an amount not in excess of \$500,000."



The proviso included in the proposed appropriation language dealing with the contract authorization would make it clear that this appropriation is intended to cover the entire cost of the facilities to be established including the liquidation of any obligations which may be incurred pursuant to the contract authorization.

(d) Acquisition of Lands for National Forests, Weeks Act

Appropriation Act, 1952 .....	\$75,000
Budget Estimate, 1953 .....	<u>75,000</u>
Change .....	<u><u>- -</u></u>

PROJECT STATEMENT

Project	1951	1952 :(estimated):	1953 :(estimated):
Acquisition of land for National Forests .....	\$248,504	\$75,000	\$75,000
Unobligated balance .....	1,496	- -	- -
Total pay adjustment costs .....	[ - - ]	[1,200]	[1,350]
Total available or estimate .....	250,000	75,000	75,000
Transferred to "Salaries and expenses, Forest Service" .....	+21,000	- -	- -
Reduction pursuant to Sec. 1214 ...	+29,000	- -	- -
Total appropriation or estimate ...	300,000	75,000	- -





## STATUS OF PROGRAM

This appropriation is provided to acquire lands for the protection of the watersheds of navigable streams and for the production of timber under the provisions of the Weeks Law of March 1, 1911 (36 Stat. 961), as amended by the Acts of June 7, 1924 (43 Stat. 654), and March 3, 1925 (43 Stat. 1215).

There are now 78 national forest and purchase units, situated in 32 States and Puerto Rico, within which acquisition of lands under the above acts has been approved by the National Forest Reservation Commission and in which lands still remain to be acquired. All but a few of these units are east of the Great Plains.

Purchase work under the above acts was initiated in 1911 in the Appalachian region and New England, and has since been extended farther throughout the eastern United States. In all but 5 of the 40 fiscal years 1911 to 1951, appropriations or allotments through executive action have been made available for land acquisition.

Within the aforesaid purchase units 22,763,406 acres have been acquired and 23,315,643 acres of land chiefly valuable for forestry and watershed purposes still remain to be acquired.

Basic purpose of this program is to conserve and build up the soil and timber resources and improve the watersheds. It is an essential part of the Nation's over-all program to minimize floods, prevent soil erosion, and provide adequate timber and water for the future. Forestry is essentially a long-time enterprise and action to assure ample timber supplies must be taken well ahead of actual needs.

The unacquired lands in these purchase units are, in large measure, principally valuable for timber growing or for watershed protection. Many of them have been heavily logged, unwisely cultivated, or otherwise impaired. Most of them should be in public ownership to assure that they will be so managed as to contribute optimum benefits to streamflow regulation and timber production.

Dispersed public ownership leads to higher unit costs of protecting and managing the Government lands. It also decreases the effectiveness of good management practices on such lands, since the intervening private areas remain subject to overcutting, unwise cultivation, overgrazing, or other detrimental practices.

There are usually available each year numerous "key" tracts of small size, and an occasional large tract of special importance from a public standpoint. As an example of the latter, in the fiscal year 1950 Middlebury College in Vermont offered to sell 9,500 acres located in the center of the Green Mountain National Forest. The tract contained about 24 million feet of stumpage much of which is in need of cutting.

Utilization of this stumpage is needed for national defense purposes and for stabilizing of local mills. The stumpage can be logged most efficiently in connection with adjacent national forest stumpage. About 25 percent of this tract was acquired with fiscal year 1951 funds. Acquisition of the remainder when possible will facilitate and expedite cutting of the stumpage in an efficient and economical manner.

The following tabulation shows the status of the existing purchase units as of June 30, 1951, and the progress expected in fiscal year 1952.

	<u>Gross Area</u> (Acres)	<u>Not To Be</u> <u>Acquired</u> (Acres)	<u>Acquirable</u> (Acres)
Purchase Units as of			
6/30/51 (78) .....	53,131,360	7,052,311	46,079,049
Total acreage under national forest administration and approved for acquisition as of 6/30/51 .....			22,763,406
Balance to be acquired as of 6/30/51 to complete purchase units .....			23,315,643
Estimated purchases during fiscal year 1952 .....			<u>10,000</u>
Balance estimated to be acquired as of 6/30/52 .....			23,305,643

It is estimated that the fiscal year 1952 appropriation will permit purchase of about 10,000 acres. Purchases will be in presently approved units and will be properties of special desirability that will consolidate existing Government ownership in the interest of economical management of the national forests.

(c) Acquisition of Lands for National Forests, Superior National Forest

Appropriation Act, 1952 .....	\$125,000
Budget Estimate, 1953 .....	<u>150,000</u>
Increase (for purchase of land pursuant to Public Law 733, approved June 22, 1948) .....	<u>+25,000</u>

Note: Although an increase in direct appropriation is requested for this item in 1953, it is estimated that there will actually be a decrease of \$57,002 on an available funds basis because of the availability of a prior year balance of \$82,002 in the fiscal year 1952.

PROJECT STATEMENT  
(on an available funds basis)

Project	1951	1952 :(estimated):	Increase : or Decrease:	1953 :(estimated)
Acquisition of lands for; national forests, Superior National Forest, Minnesota .....	\$76,422	\$207,002	-\$57,002(1):	\$150,000
Total pay adjustment costs .....	[ - - ]	[640]	[ - - ]	[640]
Total available or estimate .....	76,422	207,002	- 57,002	150,000
Prior year balance available .....	-8,424	-82,002		
Balance available in subsequent year .....	+82,002	- -		
Total appropriation or estimate .....	150,000	125,000		

DECREASE

(1) A decrease of \$57,002 in funds available for acquisition of lands in the Superior National Forests pursuant to Public Law 733, approved June 22, 1948.

The innumerable lakes and streams near the International boundary within the Superior National Forest in northeastern Minnesota provide unequalled wilderness conditions which should be preserved. Congress recognized the special value of this area by enactment of the Shipstead-Nolan Act, approved July 10, 1930. Among other things, this Act prohibits undesirable lake level changes, commercial sale of green timber from and disposal of national forest lake shore land. In recent years, however, the cargo-carrying airplane has permitted delivery of lumber, cement, and heavy household facilities to lake shores previously accessible only by canoe or on foot. This initiated a great increase in establishment of resorts and summer homes which threatens to destroy the wilderness character of the area.



By Public Law 733, approved June 22, 1948, Congress recognized the further need for immediate action to protect the most vital parts of this wilderness area. Among other things the law authorizes the appropriation of \$500,000 for the acquisition of private lands within an especially valuable area of approximately 625,000 acres, the development of which would impair or threaten the wilderness values. The appropriation requested for 1953 would exhaust the authorization of \$500,000. Most if not all of the privately-owned land within the designated area, except at Basswood Lake, is expected to be acquired through use of the \$500,000 and the use of exchange authorities. It is estimated that in fiscal years 1952 and 1953, 17,000 and 11,000 acres respectively will be acquired.

# STATUS OF PROGRAM

This appropriation provides for the purchase of lands within the Superior National Forest, Minnesota, pursuant to the special authorization of Congress contained in Public Law 733 approved June 22, 1948.

Public Law 733 was passed to preserve the wilderness conditions of a part of the Superior National Forest in Minnesota. It specifies an area in which Federal ownership is to be consolidated. This area is located within a day's auto drive or a short airplane trip of a large portion of the Nation's population. This is a highly scenic area of numerous lakes, streams, and forests typical of the "north woods" and is about the only remaining place where extensive canoe trips can be taken under primitive conditions. Commercial resorts and their need for supplies which are freighted in by seaplanes are threatening the wilderness character of the area. Preservation of the area's unique wilderness values requires consolidated Federal ownership.

During the fiscal year 1951, 43 tracts containing 5,313 acres were approved for purchase in the Superior National Forest, Minnesota, under the provisions of Public Law 733, 80th Congress.

The following table shows the status of the purchase program under this appropriation:

	<u>Acres</u>
Total acreage within area specified in Public Law 733 .....	43,000
Estimated not acquirable .....	<u>3,000</u>
Balance acquirable .....	40,000
Acquired by purchase, exchange, etc., to 6/30/51 .....	<u>11,366</u>
Balance to be acquired as of 6/30/51 .....	28,634
Estimated acquisition during fiscal year 1952 .....	<u>17,250</u>
Balance estimated to be acquired as of 6/30/52 .....	11,384

The acreage to be acquired in 1952 will depend in large part on the amount of improved land that is acquired as compared to the unimproved acreage. It is estimated that about 17,250 acres in total including some of both types will be acquired during the year.





(f) Acquisition of Lands from National Forest Receipts

Appropriation Act, 1952 .....	\$141,680
Budget Estimate, 1953 .....	<u>141,680</u>
Change .....	<u>- -</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	1953 (estimated)
1. Uinta and Wasatch National Forests: (Utah only) .....	\$6,460	\$39,830	\$39,830
2. Cache National Forest (Utah only) .....	6,995	10,000	10,000
3. San Bernardino-Cleveland National: Forests (Riverside County, California only) .....	10,000	22,000	22,000
4. Nevada-Toiyabe National Forests (Nevada) .....	9,863	10,000	10,000
5. Angeles National Forest (California) .....	16,800	20,000	20,000
6. Cleveland National Forest (San Diego County, California only) ..	- -	5,000	5,000
7. Sequoia National Forest (California) .....	14,340	34,850	34,850
Subtotal .....	<u>64,458</u>	<u>141,680</u>	<u>141,680</u>
Unobligated balance .....	73,380	- -	- -
Total pay adjustment costs .....	<u>[- -]</u>	<u>[1,200]</u>	<u>[1,200]</u>
Total appropriation or estimate ...	<u>137,838</u>	<u>141,680</u>	<u>141,680</u>

THE HISTORY OF THE UNITED STATES OF AMERICA

... ..  
... ..  
... ..

CHAPTER I

The first part of the history of the United States of America is the history of the discovery and settlement of the continent. The discovery of the continent was made by Christopher Columbus in 1492. The settlement of the continent was made by the English in 1607. The history of the United States of America is a history of the struggle for freedom and independence. The struggle for freedom and independence was fought by the American people against the British. The American people won the struggle for freedom and independence in 1776. The history of the United States of America is a history of the growth of the nation. The growth of the nation was the result of the westward expansion of the United States. The westward expansion of the United States was the result of the discovery of gold in California in 1848. The discovery of gold in California led to the California Gold Rush of 1849. The California Gold Rush led to the settlement of California and the growth of the United States. The history of the United States of America is a history of the development of the nation. The development of the nation was the result of the industrial revolution. The industrial revolution was the result of the invention of the steam engine by James Watt in 1769. The invention of the steam engine led to the development of the factory system. The factory system led to the growth of the United States. The history of the United States of America is a history of the progress of the nation. The progress of the nation was the result of the American Revolution. The American Revolution was the result of the American people's desire for freedom and independence. The American people won the American Revolution in 1776. The American Revolution led to the development of the United States. The history of the United States of America is a history of the future of the nation. The future of the nation is the result of the American people's desire for progress and development. The American people will win the future of the United States. The American people will develop the United States. The American people will progress the United States. The American people will be the future of the United States.

# STATUS OF PROGRAM

This appropriation provides for the purchase of lands under the provisions of seven special acts of Congress enumerated in the appropriation item.

These acts were passed with the support and concurrence of local people so that certain private lands intermingled with existing national forest lands could be acquired and placed under national forest administration. These lands are not in the drainages of navigable streams and, therefore, cannot be acquired under the Weeks Law of March 1, 1911. They frequently are subject to forms of misuse such as clear cutting of timber, over-grazing, removal of brush cover, etc., which lead to soil and resource depletion, and which minimize or neutralize the protection and management practices carried out on surrounding national forest lands. In the southern California areas, occupancy and use of these interspersed private lands may also create fire hazards which threaten not only these tracts but also large areas of surrounding publicly owned and protected watershed. Protection and management of such lands as part of the national forest is recognized as highly desirable by local communities, especially from the standpoint of erosion prevention and flood control. The authorizing acts provide that certain proportions of the receipts of the specified national forests may be appropriated and used for the purchase of these lands. Since 25 percent of these receipts, otherwise, would be distributed to the counties, such provision in effect means that the counties contribute one-fourth of the cost of the acquired lands.

During the fiscal year 1951, eight key tracts containing 2,934 acres were approved for purchase under the Special Forest Receipts Acts. These tracts are located in the Cache and Toiyabe National Forests, Utah and Nevada; and the Angeles, Cleveland, San Bernardino National Forests in California.

The following table shows the status of the purchase program under this appropriation:

## Purchase of Land Under the Forest Receipts Acts

<u>State and</u> <u>Purchase Unit</u>	<u>Acquired to</u> <u>6/30/51</u> <u>(Acres)</u>	<u>Estimated</u> <u>balance to</u> <u>be acquired</u> <u>(Acres)</u>	<u>Appropriation</u> <u>available in</u> <u>F.Y. 1952</u>	<u>Estimated</u> <u>acreage to</u> <u>be bought</u> <u>in 1952</u>
<u>UTAH</u>				
Uinta-Wasatch .....	83,523	79,566	39,830	7,000
Cache .....	17,391	108,620	10,000	2,000
<u>NEVADA</u>				
Nevada-Toiyabe ....	9,851	100,091	10,000	2,000



<u>State and Purchase Unit</u>	<u>acquired to 6/30/51 (Acres)</u>	<u>Estimated balance to be acquired (Acres)</u>	<u>Appropriation available in F.Y. 1952</u>	<u>Estimated acreage to be bought in 1952</u>
<u>CALIFORNIA</u>				
Cleveland-				
San Bernardino (Riverside County)	10,930	71,080	22,000	4,500
Angeles .....	1,222	26,768	20,000	800
Cleveland				
(San Diego County)	1,040	89,950	5,000	1,000
Sequoia .....	<u>7,659</u>	<u>37,263</u>	<u>34,850</u>	<u>2,700</u>
	131,616	513,338	141,680	20,000

The approximately 20,000 acres to be acquired with the fiscal year 1952 appropriation will be tracts within the designated units for which public ownership offers the best assurance of adequate protection of soil and vegetative growth, restoration where necessary, and long-time management with emphasis on watershed and erosion protection.

(g) State and Private Forestry Cooperation

Appropriation Act, 1952 .....	\$10,750,000
Anticipated pay adjustment supplemental .....	48,000
Base for 1953 .....	10,798,000
Budget Estimate, 1953 .....	10,793,000
Decrease (due to partial absorption of pay adjustment costs) .....	<u>-5,000</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	Decrease (pay adjustment) absorption	1953 (estimated)
1. Cooperation in forest fire control .....	\$9,482,932	\$9,449,500	- -	\$9,449,500
2. Cooperation in forest tree planting .....	441,457	447,061	- -	447,061
3. Cooperation in forest management and processing .....	627,555	633,904	- -	633,904
4. Cooperation in farm forestry extension ....	104,023	107,835	- -	107,835
5. General forestry assistance .....	150,473	159,700	\$-5,000	154,700
Subtotal .....	10,806,440	10,798,000	-5,000	10,793,000
Unobligated balance .....	26,360	- -	- -	- -
Total pay adjustment costs:	[- -]	[54,492]	[+508]	[55,000]
Total available or estimate .....	10,832,800	10,798,000	-5,000	10,793,000
Transfer to "Salaries and Expenses, Forest Service" .....	+30,800	- -		
Transferred in 1952 estimates from "Salaries and Expenses, Forest Service" .....	-67,800	- -		
Reduction pursuant to Sec. 1214 .....	+4,200	- -		
Anticipated pay adjustment supplemental .....	- -	-48,000		
Total appropriation or estimate .....	10,800,000	10,750,000		

CHANGE IN LANGUAGE

The estimates include a proposed change in the language of this item as follows (new language underscored, deleted matter enclosed in brackets):

- For expenses necessary for cooperation with the various States in forest-fire prevention and suppression, in forest tree planting, in forest management and processing, and in farm forestry extension, pursuant to the Act of August 25, 1950
- 1 ([Public Law 729] 16 U. S. C. 568c, 568d), and sections 1, 2, 3, 4, and 5 of the Act of June 7, 1924 (16 U. S. C. 564-568a), and Acts supplementary thereto \* \* \*

This change substitutes a code citation for the former reference to the Public Law.



## STATUS OF PROGRAM

### Current Activities:

This program, for the most part carried on in cooperation with the States, encourages private timber growing through assistance in preventing and suppressing forest fires, reforestation of denuded areas, good management of woodlands, and farm forestry extension work.

The program centers on forest land in private ownership although to a minor degree it includes State-owned lands and Federal lands under long-term lease to the States. These privately owned lands comprise three-fourths of the Nation's commercial forest area. They are the most productive and accessible forest lands and from them comes 90 percent of all timber cut. The program further centers on small forest properties in private ownership because (1) 76 percent of the private commercial forest acreage is in small holdings averaging only about 62 acres each, (2) the small-owner group includes 99 percent of all private forest owners, and (3) present cutting practices are poorest on these small properties and their owners do not have the technical knowledge or skills necessary to put their woodlands in productive condition.

### Recent Progress and Trends:

Cooperation in forest fire control. The States continued to increase their acreages of State and private lands placed under organized cooperative protection from wild fires. For the calendar year 1950 this increase amounted to 3.4 million acres.

The southern States experienced a very serious forest fire season. Man-caused fires increased by 21,000 over the previous year. Much of this was due to the long, dry seasons when burning conditions were extreme. For the Nation as a whole less than 1 percent of the acreage of State and private lands protected was burned while on the unprotected areas it is estimated that over 17 percent burned.

Law enforcement is progressing as shown by an increase of prosecutions, 6,880 in 1949, 7,304 in 1950. Over 90 percent of the prosecutions resulted in convictions.

Although the Federal appropriation for this work in fiscal year 1951 was slightly less than in fiscal year 1950, the State and private agencies during the fiscal year 1951 increased their expenditures by more than 3-3/4 million dollars. (See table attached for comparison of Federal and State and Private expenditures.)

The Federal Civil Defense Administration has officially included the protection of all wild lands from fire as part of the Nation-wide civil defense program. During the year, State and Federal protection agencies completed a comprehensive study and report on wild land protection needs in time of a national emergency.

Other examples of recent cooperative progress:

- (a) Steady progress in reducing average size fires--35 acres in 1950.
- (b) Increased activity in training crew leaders and fire fighters.
- (c) Preparation of better fire plans, manuals, and cooperative protection arrangements.
- (d) Increased procurement of mechanical line building equipment and radio equipment.
- (e) Intensification of Nation-wide (Smokey Bear) and local fire prevention programs designed to reduce the number of man-caused fires.
- (f) Enactment of stronger State fire control legislation.
- (g) Increased activities by States in the enforcement of State fire laws.

Cooperation in forest tree planting (Forest Service). The tree planting job in this Nation is a big one. Over 60 million acres of denuded and poorly stocked forest land in private ownership can be made productive once more if planted. Low-cost planting stock grown in State-operated nurseries has proved a powerful stimulant in getting the many small owners to plant more of their idle acres. The availability of tree planting machines in constantly increasing numbers makes the job easier and cheaper for the landowner.

In fiscal year 1951 the 41 cooperating States and 2 Territories distributed about 292,000,000 seedlings--enough to plant about 300,000 acres. The States contributed about 1,500,000 to the cost of growing and distributing the trees. The Federal share was \$442,000. In addition to providing the land for planting, the private owners invested, in terms of part of the cost of the seedlings and the planting costs, at least four times the public expenditure.

Cooperation in forest management and processing (Forest Service). An adequate forest resource is indispensable. The hard core of this Nation's forest resource problem is the present unproductive condition of small forest holdings. These aggregate three-fourths of the total privately owned forest acreage and more than half of all forest land, public and private, in the country. They are held in more than 4 million individual small ownerships. Less than 5 percent of these small forests are now in good productive condition.

Experience shows conclusively that many of these small forest owners must have individual on-the-ground technical assistance and direction if the downward trend in forest productiveness is to be reversed. This assistance is an essential complement to mass educational efforts. The 243 service foresters employed cooperatively by Federal and State forest services are beginning to make substantial progress in helping landowners make these forests productive again. In fiscal year 1951 they got 25,352 small woodland owners headed toward useful forest production, a total of 2,558,000 acres. At the end of the year there was a backlog of 4,718 requests for help which could not be reached.

Cooperation in farm forestry extension (Extension Service). In line with the Agricultural Extension Service philosophy to help farmers help themselves, the extension foresters carry on an educational

program among farmers through county agricultural agents. The farm forestry extension program includes woodland management, harvesting, marketing, and utilization of forest products; tree planting for future forest crops, erosion control, protection to farmsteads, crops, livestock, and soil; wood preservation; production of maple sirup and naval stores; fire prevention and control; wildlife conservation; and forestry projects for rural youth.

Special emphasis is being placed on the field of wood preservation, on sawmill short courses, and on tree planting.

- (a) The Idaho Extension Service advises that savings to farmers of the State by following recommended treating practices will total \$383,000 per year for fence posts alone.
- (b) Sawmill short courses conducted in Illinois, Missouri, West Virginia, Washington, and Wisconsin have effected substantial savings to farmers and to small sawmill operators through improved sawing methods, log grading, and better utilization, all of which aid in the defense program.
- (c) In Georgia, 150 planting machines were purchased by the Fulton National Bank and other banks in the State, and were made available to farmers, free of charge, through county agricultural agents. Plans are being made to increase tree nursery production during the next 5-year period to 100,000,000 seedlings per year (treble the present production), which means Georgia is looking forward to a long-time sound investment and the farmers will benefit thereby.

While this extension forestry program was intended to be on a 50-50 cooperative basis with the States, the States are financing more than half the cost, the ratio being about one-third Federal to two-thirds State.

General forestry assistance (Forest Service). As the major Federal agency dealing with forestry, the Forest Service gets thousands of inquiries and requests from the general public for information on forestry matters. Most of the inquiries from private consulting foresters, State foresters, professional forestry schools, industrial foresters, and from other Federal departments are highly technical and ordinarily the information or technical advice needed is not available anywhere else. Much of this requested assistance is given by field technicians of the Service and involves numerous field surveys, consultations, etc. Also included in this item is administration of nearly 500,000 acres of federally owned forest land under long-term lease to the States.



State Allotments and Expenditures for Cooperation in Forest Fire Control

State	State and Private		Federal
	Funds Expended, F.Y. 1951		Allotments, F.Y. 1952
Alabama .....	675,688		6309,354
Arkansas .....	544,389		251,543
California .....	6,499,906		1,522,988
Colorado .....	53,636		25,712
Connecticut .....	96,116		45,594
Delaware .....	12,736		12,555
Florida .....	1,234,815		524,218
Georgia .....	1,190,625		431,125
Hawaii .....	5,867		4,185
Idaho .....	258,985		132,551
Illinois .....	49,845		25,000
Indiana .....	102,669		53,834
Iowa .....	17,736		25,000
Kentucky .....	139,726		93,287
Louisiana .....	743,926		273,948
Maine .....	665,058		208,423
Maryland .....	319,690		92,464
Massachusetts .....	292,127		105,998
Michigan .....	1,045,313		401,426
Minnesota .....	572,102		249,925
Mississippi .....	796,442		241,524
Missouri .....	412,224		189,746
Montana .....	132,679		71,262
Nevada .....	20,277		25,000
New Hampshire .....	157,799		64,569
New Jersey .....	263,340		98,317
New Mexico .....	5,285		25,000
New York .....	716,998		226,258
North Carolina .....	581,995		264,555
Ohio .....	113,937		54,092
Oklahoma .....	164,957		67,576
Oregon .....	1,534,927		658,595
Pennsylvania .....	470,681		195,841
Rhode Island .....	79,496		25,000
South Carolina .....	505,447		297,778
South Dakota .....	32,143		25,000
Tennessee .....	324,803		164,113
Texas .....	345,057		156,849
Utah .....	44,545		25,000
Vermont .....	41,969		25,000
Virginia .....	462,831		196,110
Washington .....	1,362,413		603,072
West Virginia .....	272,075		152,020
Wisconsin .....	800,602		306,593
Administration, Inspection, Prevention, and Special Services to States .....			475,500
Grand Totals .....	24,163,877		9,423,500

(h) Cooperative Range Improvements

Appropriation Act, 1952 .....	\$700,000
Budget Estimate, 1953 .....	<u>700,000</u>
Change .....	<u>- -</u>

Note: (Although no increase in appropriation is requested for this item in 1953, there will actually be a decrease of \$231,340 on an available funds basis because of the availability of a prior year balance of this amount in the fiscal year 1952)

PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase or Decrease	1953 (estimated)
Cooperative range improve- ments .....	\$468,660	\$931,340	-\$231,340(1)	\$700,000
Total pay adjustment costs	[ - - ]	[ 34,000 ]	[ +3,000 ]	[ 37,000 ]
Prior year balance available:	- -	-231,340	+231,340	- -
Balance available in subse- quent year .....	+231,340	- -	- -	- -
Total appropriation or estimate .....	700,000	700,000	- -	700,000

DECREASE

The decrease of \$231,340 in funds available in the fiscal year 1953 results from a carry-over in the fiscal year 1952 from the fiscal year 1951--the first year of operation under this appropriation. The reduction in the amount available in 1953 will result in less maintenance and construction of range improvement projects in the fiscal year 1953.

CHANGE IN LANGUAGE

The estimates include a proposed change in the language of this item as follows (new language underscored, deleted matter enclosed in brackets):

For artificial revegetation, construction, and maintenance of range improvements, control of rodents, and eradication of poisonous and noxious plants on national forests, as authorized by section 12 of the Act of April 24, 1950 ([Public Law 478] 16 U.S.C. 580h), \$700,000, to remain available until expended:  
\* \* \*

This change substitutes a code citation for the former reference to the Public Law.





STATUS OF PROGRAM

Of the moneys received from grazing fees from each national forest there is made available at the end of each fiscal year, when appropriated by Congress, an amount equivalent to 2 cents per animal-month for sheep and goats and 10 cents per animal-month for other kinds of livestock under permit on such national forest during the calendar year in which the fiscal year begins. The fiscal year 1953 appropriation will be derived from fiscal year 1952 receipts and based on animal-months in calendar year 1951. The funds will be used mainly for the construction and maintenance of range improvements such as fences, stock watering facilities, bridges, corrals, driveways, etc., in order to protect or improve the future productivity of the range.

During fiscal year 1951 approximately \$266,000 was spent for maintenance of existing improvements; \$12,000 for range revegetation; and approximately \$193,000 obligated for construction of range improvements. The partial obligation of total funds was due largely to the late receipt of appropriations.



(i) Expenses, Brush Disposal

Appropriation Act, 1952 .....	\$1,400,000
Budget Estimate, 1953 .....	<u>1,400,000</u>
Change .....	<u>- -</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	1953 (estimated)
Brush disposal .....	- -	\$313,000	\$500,000
Total pay adjustment costs .....	[- -]	[17,000]	[26,000]
Total available or estimate .....	- -	313,000	500,000
Prior year balance available .....	- -	-387,763	-1,469,763
Balance available in subsequent year	+387,763	+1,469,763	+2,369,763
Total appropriation or estimate ...	387,763	1,400,000	1,400,000





STATUS OF PROGRAM

This was a new permanent appropriation account established in the fiscal year 1951 as a result of the passage of the Granger-Thye Act of April 24, 1950, Public Law 478 (81st Congress). Collections for brush disposal are now deposited to this new account instead of to the trust fund "Cooperative Work, Forest Service", as formerly. Deposits in the fiscal year 1951 were small because of delays in getting the new fund established and because certain contractual arrangements with depositors necessitated the continuation of deposits to the Cooperative Work account.

No obligations were incurred in the fiscal year 1951 because of the availability of carry-over balances in the brush disposal project of Cooperative Work trust fund. Obligations lag considerably behind collections because deposits are made in advance of cutting, and the progress of disposal operations is dependent upon favorable weather conditions after the timber is cut.





(j) Payment to Minnesota (Cook, Lake, and Saint Louis Counties)  
from the National Forests Fund

Appropriation Act, 1952 .....	\$45,000
Budget Estimate, 1953 .....	<u>45,000</u>
Change .....	<u>- -</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	1953 (estimated)
Payment to Minnesota (Cook, Lake, and Saint Louis counties) from the national forests fund (appropriation or estimate) .....	\$43,548	\$45,000	\$45,000



STATUS OF PROGRAM

Section 5 of Public Law 733, 80th Congress, approved June 22, 1948, provides that the Secretary of the Treasury, upon certification of the Secretary of Agriculture, shall pay to the State of Minnesota at the close of each fiscal year an amount equivalent to three-fourths of one percent of the fair appraised value of certain National Forest lands in the counties of Cook, Lake, and St. Louis situated within the Superior National Forest. The Act further provides that payment to the State shall be distributed to each of these counties in conformity with the fair appraised value of such National Forest lands in each county.





(k) Payments to School Funds, Arizona and New Mexico,  
Act of June 20, 1910

Appropriation Act, 1952 .....	\$107,294
Budget Estimate, 1953 .....	<u>107,294</u>
Change .....	<u><u>- -</u></u>

PROJECT STATEMENT

Project	:	:	1952	:	1953
	:	1951	:(estimated)	:	:(estimated)
Payments to school funds, Arizona	:	:	:	:	:
and New Mexico, Act of June 20,	:	:	:	:	:
1910 (appropriation or estimate) ..:	:	\$71,930:	\$107,294:	:	\$107,294





STATUS OF PROGRAM

The States of Arizona and New Mexico are reimbursed, as income for their common-school fund, in such proportion of the gross proceeds of all the national forests within those States as the area of land granted to the States for school purposes within the national forests bears to the total area of all national forests within the States. (Act of June 20, 1910; 36 Stat. 562, 573.)

As soon after close of the fiscal year as the receipts from national forests and the area of school lands in the States of Arizona and New Mexico are determined, the payments are made to the States. Payments in fiscal year 1952 will be 106,430 to Arizona and 9863 to New Mexico.



(1) Payments to States and Territories  
from the National Forests Fund

Appropriation Act, 1952 .....	\$13,975,000
Budget Estimate, 1953 .....	<u>15,020,000</u>
Increase (due to an estimate increase in the National Forest receipts for the fiscal year 1952) .....	<u>+1,045,000</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase	1953 (estimated)
Payments to States and Territories from National Forests Fund (appro- priation or esti- mate) .....				
	\$8,362,897	\$13,975,000	+\$1,045,000(1)	\$15,020,000

INCREASE

(1) The increase of \$1,045,000 in this item for payments to States and territories in the fiscal year 1953 results from an estimated increase in National Forest receipts for the fiscal year 1952.





The Acts of May 23, 1908, and March 1, 1911, as amended by the Act of June 30, 1914, require, with a few exceptions, that 25 percent of all money received from the national forests during any fiscal year be paid to the States and Territories in which the forests are located, for the benefit of public schools and public roads of the county or counties in which such national forests are situated. The amount of this appropriation varies each year in direct proportion to national forest receipts during the previous fiscal year.

The reductions made, or the amounts set aside, from receipts collected for the sale of national forest timber, grazing and special use permits, etc., before the 25 percent is applied, are listed below:

1. Receipts from the Tongass National Forest, Alaska, are being held in a suspense account pending the settlement of Indian rights under the provisions of the Act of August 8, 1947, Public Law 385.
2. The receipts from certain lands in the Mt. Hood National Forest, Oregon, are paid to Confederated Tribes of the Warm Springs Reservation of Oregon, under the terms of the Act of July 3, 1948, Public Law 892.
3. The receipts from parts of three counties in the Superior National Forest under the terms of the Act of June 22, 1948, Public Law 733.
4. For lands in certain counties in Utah, Nevada, and California, the States receive 25 percent of receipts only after funds have been set aside for the acquisition of national forest lands within the specified national forests under the terms of special acts authorizing annual appropriations from forest receipts for this purpose.
5. The receipts from certain lands in Oregon are being held in a suspense account pending determination of the custody of these lands.
6. Payments to the States of Arizona and New Mexico under the provisions of the Act of June 20, 1910, of shares of the gross receipts from the national forests in those States which are proportionate to the areas of land granted to the States for school purposes within the national forests.





(m) Roads and Trails for States, National Forests Fund

Appropriation Act, 1952 .....	\$5,600,000
Budget Estimate, 1953 .....	<u>6,000,000</u>
Increase (due to an estimated increase in the National Forest receipts for the fiscal year 1952) .....	<u>+400,000</u>

PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase	1953 (estimated)
1. Construction of roads and trails .....	\$2,470,207	\$4,547,000	+\$400,000(1)	\$4,947,000
2. Maintenance of roads and trails .....	544,940	1,053,000	- -	1,053,000
Subtotal .....	3,015,147	5,600,000	+400,000	6,000,000
Total pay adjustment costs	[ - - ]	[ 111,000 ]	[ +3,000 ]	[ 114,000 ]
Prior year balance available in 1951 .....	-3,051,639			
1951 balance available in 1952 .....	+3,382,931	-3,382,931	- -	+3,382,931
1952 balance available in 1953 .....	- -	+3,382,931	- -	-3,382,931
Total appropriation or estimate .....	3,346,439	5,600,000	+400,000	6,000,000

INCREASE

(1) The increase of \$400,000 in this item for fiscal year 1953 results from an estimated increase in National Forest receipts for the fiscal year 1952.

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STATUS OF PROGRAM

The act of March 4, 1913, appropriated 10 percent of all moneys received from the national forests during each fiscal year to be expended by the Secretary of Agriculture for the construction and maintenance of roads and trails within the national forests in the States from which such proceeds are derived. (16 U.S.C. 501.)

The following tabulation shows the distribution by States of allotments made to the Forest Service in the fiscal year 1951 which were derived from national forest receipts collected in the fiscal year 1950.

<u>State</u>	<u>Amounts</u>	<u>State</u>	<u>Amounts</u>
Alabama .....	45,619	New Hampshire .....	9,567
Alaska .....	2,314	New Jersey .....	---
Arizona .....	116,555	New Mexico .....	54,737
Arkansas .....	199,503	New York .....	---
California .....	398,419	North Carolina .....	25,454
Colorado .....	90,029	North Dakota .....	16
Florida .....	23,064	Ohio .....	1,672
Georgia .....	26,070	Oklahoma .....	22,241
Idaho .....	198,113	Oregon .....	892,038
Illinois .....	4,953	Pennsylvania .....	9,135
Indiana .....	594	Puerto Rico .....	1,479
Iowa .....	184	South Carolina .....	60,082
Kansas .....	---	South Dakota .....	15,492
Kentucky .....	14,720	Tennessee .....	20,272
Louisiana .....	45,069	Texas .....	135,610
Maine .....	760	Utah .....	65,021
Maryland .....	---	Vermont .....	9,559
Michigan .....	32,997	Virginia .....	14,326
Minnesota .....	28,818	Washington .....	489,607
Mississippi .....	106,034	West Virginia .....	8,619
Missouri .....	10,607	Wisconsin .....	26,466
Montana .....	62,757	Wyoming .....	47,596
Nebraska .....	4,758		
Nevada .....	18,913	Total .....	3,360,039





(n) Cooperative Work, Forest Service  
(Trust Fund)

Funds received as contributions for cooperative work in protection and improvement of the national forests, forest investigations and protection, reforestation and administration of private forest lands are deposited in this account for use in meeting the expenses of the Forest Service in performing work for contributors. This trust fund represents an important activity of the Forest Service. For that reason, a statement of funds received and obligated, and balances available by major activities follows. In addition, a detailed description of the work performed by these major activities is also included.





COOPERATIVE WORK, FOREST SERVICE

Trust Fund

Project	Balance available June 30, 1950	Actual fiscal year 1951		Estimate fiscal year 1952		Estimate fiscal year 1953	
		Funds received	Obligations	Funds received	Obligations	Funds received	Obligations
1. Construction and maintenance of roads and trails	\$ 251,779	\$ 693,057	\$ 497,945	\$ 446,891	\$ 500,000	\$ 446,891	\$ 500,000
2. Construction and maintenance of other improvements	365,449	270,106	417,520	218,035	400,000	218,035	400,000
3. Protection of national forests and adjacent private land	1,245,710	1,334,026	1,250,543	1,329,193	1,400,000	1,329,193	1,400,000
4. Sale-area betterment and scaling	4,248,491	3,805,023	1,936,131	6,117,383	2,965,000	6,964,063	3,065,000
5. Forest investigation	98,134	461,331	383,535	175,930	425,000	175,930	425,000
6. Administration of private lands	51,564	125,974	115,110	62,428	120,000	62,428	120,000
7. Reforestation	22,762	53,859	34,281	42,340	40,000	42,340	40,000
8. Brush disposal <sup>1/</sup>	1,326,177	1,461,399	1,040,896	1,746,680	1,53,320	900,000	900,000
9. Refunds to cooperators	--	222,470	222,470	--	150,000	--	150,000
10. Reimbursements from non- Federal sources	--	--	--	--	--	--	--
Total	\$7,610,066	\$8,429,113	\$5,900,299	\$10,138,880	\$7,000,000	\$10,138,880	\$7,000,000
							\$10,138,880

Note: Balances carried forward are due primarily to necessity of deferring work for which funds are deposited until the most practicable time. For instance, funds for sale-area betterment are received in advance of cutting, but work cannot be started until cutting operations are completed. The time lag sometimes extends for several years, depending on amount of preparatory work in sale area required, weather conditions, etc. Likewise, funds received for "protection" are usually deposited in the spring but most obligations occur after July 1.

<sup>1/</sup> See also "Expenses, Brush Disposal."



The major programs conducted under the account "Cooperative Work, Forest Service" are described below in terms of the projects reflected in the preceding statement.

1. Construction and Maintenance of Roads and Trails, and
2. Construction and Maintenance of Other Improvements

Acts of June 30, 1914 (16 U.S.C. 498) as amended by Act of April 24, 1950 (16 U.S.C. 572). Acceptance of deposits for "Cooperative Work in . . . improvement of the national forests" is authorized under the above Acts. Deposits are accepted from States, Counties, associations, etc. for the construction and maintenance of improvements which are of mutual benefit to both parties or of public benefit. For example, many cooperative agreements are made with counties for the construction and maintenance of roads. In some cases the Forest Service will pay a county for constructing a short section of road at a terminus of the county road system. In other cases a county will deposit money to the Cooperative Work fund to cover the cost of constructing a short stretch of county road which connects with a Forest Service road.

Timber purchasers are required to make repairs or take other corrective measures for damages resulting from their logging operations to national forest lands, residual timber or improvements or for the maintenance occasioned by their heavy hauling on forest roads. In many instances purchasers prefer that such repairs or corrective measures be done by the Forest Service at the operator's expense. Typical cooperative work under this arrangement is the added road maintenance required to keep roads in condition under heavy logging traffic, repair of telephone lines damaged in logging and measures to check erosion in skid trails.

Until the development, in recent years, of heavy duty trucks for log hauling, the collections from timber-sale operators were relatively minor. However, the trucks now in use are so large and carry such heavy loads that maintenance costs are excessive and the timber-sale operators are required to keep the roads in repair or to deposit moneys in the Cooperative Work fund to cover the cost of such work performed for them by the Forest Service. Many operators, of course, maintain the logging roads themselves and do not for that reason, make deposits to the Cooperative Work fund.

3. Protection of National Forests and adjacent private lands

The Act of June 30, 1914 (16 U.S.C. 498) authorizes the acceptance of deposits for the protection of the national forests and the Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for the protection of private lands in or near the national forests. The major portion of the obligations is for the protection of private lands from fire. This arrangement is of mutual advantage to both parties inasmuch as there are millions of acres of private forest land intermingled with land in Federal ownership on the national forests. The lands in private ownership are usually broken up into tracts so small that it would be uneconomic for the owner to



set up a fire control organization for the protection of his lands. The advantage to the Government arises from the fact that in many cases it would be necessary to suppress the fires on the private land without reimbursement in order to protect the adjoining Federal land. Ordinarily contributions are not solicited from resident owners, because their active participation in fire prevention and suppression action is considered to be of more value than the monetary contributions.

#### 4. Sale Area Betterment and Scaling

Sale area betterment. Under Section 3 of the Act of June 9, 1930 (16 U.S.C. 576b) funds are collected from timber sale operators to "cover the cost to the United States of (1) planting (including the production or purchase of young trees), (2) sowing with tree seeds (including the collection or purchase of such seeds), or (3) cutting, destroying or otherwise removing, undesirable trees or other growth on national forest land cut over by the purchaser in order to improve the future stand of timber . . . ."

This "K.V. Act" (Knutson-Vandenberg) of 1930 enables the Forest Service to insure establishment, after cutting, of a new crop where natural reproduction is unsatisfactory, to control residual stand composition where undesirable species tend to invade cut-over areas, and to take special measures to improve the quality of the future crop of timber. Such expenditures are essential to prevent deterioration on many sale areas and to insure marketability of the next stand of timber. These funds may be used only within the limited area of the timber sale involved in each case.

The average collection in 1951 was 83 cents per thousand board feet cut on the national forests. However, the averages by regions varied widely, from 56 cents per thousand in the Intermountain Region, to \$1.28 per thousand in the Lake States and \$1.80 in the South. In the Lake States Region the amount collected is used largely for reforestation to supplement and improve natural regeneration on the cut-over areas. In the South the primary problem is to control inferior hardwoods on the highly productive pine producing lands, and most of the amount collected is used for removing the hardwoods which otherwise would crowd out pine seedlings on cut-over areas.

On cut-over timber-sale areas, as of July 1, 1951, 94,755 acres of national forest land have been reforested and there are over a half million acres on which timber-stand-improvement work has been done with money collected under authorization of the Knutson-Vandenberg Act.

During fiscal year 1951, obligations for "K.V." work on all national forests amounted to slightly less than \$2 million. This program resulted in 20,545 acres of cut-over land planted and seeded; 11,432 acres prepared for natural seeding by scarifying, poisoning rodents and other seed bed preparation; 7,282 acres of plantation release of trees planted previously on cut-over areas; 233,218 acres of

cut-over land treated to release, weed and thin residual and new stands of natural young growth; 82,694 acres of promising saplings and poles remaining on cut-over acres pruned; 10,186 acres of cut-over area treated to prevent damage to young growth by hogs, sheep, deer and other grazing animals; 451 acres treated to control rodents where these pests were damaging young growth; 8,497 acres treated to control tree diseases threatening young growth; and 5,223 acres were treated to prepare the cut-over acres for planting.

Work accomplished with "K.V." funds falls in three general groups:

- (1) Regeneration including planting, seeding and special measures to facilitate natural seeding. Normally these activities can be carried on within three years after the area is cut-over, the elapsed time depending largely upon the amount of preparatory work the cut-over area requires before the regeneration measures can be carried out.
- (2) Measures to assure survival of young growth. This includes removal of inferior tree species and worthless brush through girdling, cutting, poisoning, and to a lesser extent animal, rodent, and disease control. The time lag between cutting and performance of this work varies with the nature of the element to be controlled and the size and ability of the young growth to meet such competition. Normally the work can be done within a two or three year period but frequently such protection must extend for some 7 to 10 years.
- (3) Measures to improve the future stand of timber. This is largely in the form of pruning residual trees left on the cut-over area, which can be done promptly, and non-commercial thinning of crowded young growth which may require a wait of 10 to 12 years after cutting for such stagnation to develop.

Scaling. Under provisions of Section 210 of the Act of September 21, 1944 (16 U.S.C. 572a) acceptance of deposits from timber purchasers for cooperative scaling service is authorized. This authority is used where it is possible to provide additional scaling or measurement services or records which the operator desires. Such arrangements are established only when requested by the operator and when it is determined the additional work can be performed without cost to the Government. Where cooperative scaling is done, the cost of the job is divided equitably between the Government and the operator on the basis of time spent on obtaining the records required by each party. The operator's share is deposited in the cooperative fund. This arrangement is possible in only a limited number of situations.

Through avoiding unnecessary duplication of personnel, it permits more efficient operation by both the purchaser and the Government. The amounts collected annually are less than \$100,000.

5. Forest Investigations

The Acts of June 30, 1914, and May 22, 1928, authorize the acceptance of deposits for forest investigations. Deposits are received from States, associations, industrial concerns and others to finance research projects which are of mutual benefit to both parties. For example, when a comprehensive forest survey is inaugurated in a State, the State authorities may make a deposit to the Cooperative Work fund for a more intensive survey than the Forest Service requires. In other cases an industrial concern will ask the Forest Products Laboratory to undertake a research project in which the company is interested, and will deposit funds to cover the cost of the project. The results of the investigation are furnished to the depositor. They also add to the store of public knowledge on that particular subject on file at the Laboratory.

6. Administration of private lands

The Act of March 3, 1925 as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for the management of private lands. These contributions are made by private owners who wish their lands managed in accordance with good forest management practices. Their holdings are usually too small to warrant the employment of professional foresters to administer such tracts. The advantages to the Government include the avoidance of possible high fire hazard areas resulting from improper cutting practices, the elimination of the necessity of precisely marking the boundaries of the private land, and the addition of an area of private forest land handled under proper forest practices.

7. Reforestation

The Act of March 3, 1925 as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for reforestation of private lands intermingled with national-forest lands. This work is limited to areas of private land within a planting project on the national forests or to areas which certain civic and other public spirited organizations have taken an interest in.

8. Brush disposal

This activity was originally authorized under the Act of August 11, 1916. Section 6 of the Act of April 24, 1950 (64 Stat. 82) amended the first named act, and removed deposits for slash disposal from the "Trust Fund" category. A separate appropriation was established in 1951 entitled "Expenses of Brush Disposal." While new transactions for this class of work are not a part of the Cooperative Work fund, brush disposal work will be continued for some time under certain contracts entered into prior to the amendment.



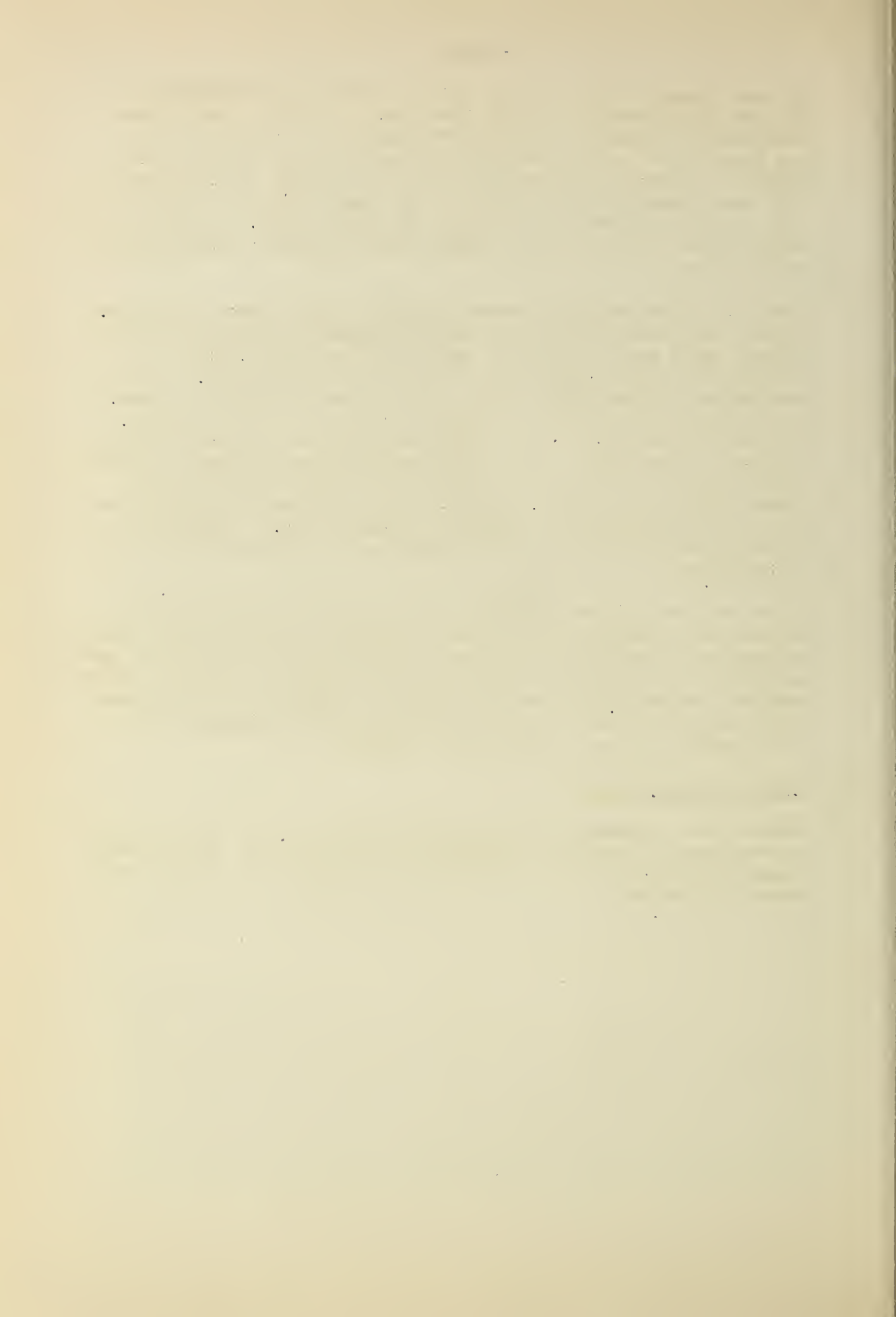
National forest timber sale contracts require the purchasers to dispose of the debris resulting from their cutting to the degree considered necessary by the officer authorized to make the sale. The above cited 1916 Act merely provides authority for the Forest Service to perform this obligation of the operator at his expense. This arrangement normally works out in a more efficient slash disposal job. Most timber purchasers prefer this arrangement. Under the terms of the 1950 Act the purchaser may be required to make deposits for this work.

There is a wide variation between regions in the amounts collected. In the three eastern Regions, where the generally humid atmosphere induces rapid decomposition of debris on the forest floor, the collections average from 2 cents to 14 cents per thousand. On most sales in those Regions little or no slash disposal is needed, but scattering or piling and burning is necessary on a few areas, such as in Minnesota. At the other extreme, the Northern Rocky Mountain Region (North Idaho and Western Montana) collects approximately \$1.07 per thousand for piling and burning the brush and other debris on sale areas. In this Region the rate of decomposition is slow and the fire hazard is extremely high. Disposal of brush is essential if serious and catastrophic forest fires are to be prevented.

In the Western Regions purchasers are required to perform slash disposal on a number of individual sales or to perform certain phases of the work which they can do more efficiently with their crews and equipment. While slash disposal follows general prescriptions within regions, the individual needs of each sale offering are considered prior to advertisement and appropriate specific requirements are incorporated into each timber sale contract.

9. Refunds to cooperators.

This project includes refunds to cooperators of excess deposits, and in the case of "sale area betterment" work, transfers to the Forest Reserve Fund when the cost of the work performed is less than the amount collected.



STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Agricultural Marketing Act (RMA-Title II):</u>			
<u>Agriculture (Forest Service):</u>			
Research on markets and prices for farm forest products .....	\$43,679:	\$24,000:	\$39,000
<u>Control of Forest Pests, Agriculture</u>			
<u>(Forest Service):</u>			
For white pine blister rust control on: national forests .....	1,773,907:	1,750,000:	2,213,000
For insect control on national forests .....	3,129,897:	1,762,000:	a/ 2,973,900
Total, Control of Forest Pests .....	4,903,804:	3,512,000:	5,186,900
<u>Flood Control, Agriculture (Forest</u>			
<u>Service):</u>			
For preliminary examinations and surveys .....	680,351:	645,699:	558,000
For works of improvement .....	991,014:	793,701:	861,260
For General Basin investigations .....	- - :	38,000:	110,000
Total .....	1,671,365:	1,477,400:	1,529,260
<u>Administrative Expenses, Section 392,</u>			
<u>Agricultural Adjustment Act of 1938,</u>			
<u>(Forest Service):</u>			
For cooperation with Production and Marketing Administration in adminis- tration of the naval stores conserva- tion program .....	19,756:	20,844:	20,864
<u>Local Administration, Section 388, Agri-</u>			
<u>cultural Adjustment Act of 1938,</u>			
<u>(Forest Service):</u>			
For cooperation with Production and Marketing Administration in adminis- tration of the naval stores conser- vation program .....	102,917:	108,425:	116,600

a/ Allotment for 1953 is preliminary.



Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Emergency Reconstruction and Repair,</u>			
<u>Forest Service:</u>			
For reconstruction and replacement of roads, trails, bridges, telephone lines, and other facilities and improvements in the national forests damaged or destroyed by floods (This represents balance of supplemental appropriations made in 1948 and 1949 for repair of flood damage) .....	46,361:	---	---
<u>Acquisition of Lands and Construction of Improvements, Coronado National Forest:</u>			
For acquisition of lands and construction of improvements in the Coronado National Forest, Arizona as authorized in P. L. 229, approved August 15, 1949: (Permanent appropriation of receipts in 1950 for sale of lands. 63 Stat. 606)	---	16,177:	---
<u>Payments for Sale of Land and Timber:</u>			
For refunds of payments for sale of land and timber .....	3,450:	4,000:	4,000
<u>Working Funds, Agriculture (Forest Service) (General Account) Advanced from:</u>			
<u>Department of Defense, Department of the Air Force:</u>			
For research and consulting services: on sandwich materials, aircraft cargo floor panels, packaging and container problems, glues, plastics, core and bonding materials .....	142,458:	187,940:	---
<u>Department of Defense, Department of the Army:</u>			
For relocation and replacement of Forest Service facilities necessitated by development of dams and reservoirs .....	10,225:	510,275:	---
For research on glues for plywood and other military items, packaging and container problems, wood skis, prefabricated housing, soil trafficability, and fire damage in forested areas; survey of forest products requirements for military purposes; and classified research..	415,408:	366,761:	---
Total, Department of the Army .....	425,633:	877,036:	---

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Working Funds, Agriculture (Forest Service) (General Account) Advanced from: (Continued)</u>			
<u>Department of Defense, Department of the Navy:</u>			
For research on plywood, glues, laminated plastics, sandwich construction, core and bonding materials, packaging and container materials .....	105,430:	64,044:	---
<u>National Advisory Committee on Aeronautics:</u>			
For studies of adhesives with improved temperature resistant properties, and of the strength and bonding of cellular cores for sandwich construction .....	17,625:	20,000:	---
<u>Department of the Interior:</u>			
For protection of Department of the Interior lands within national forests and for smoke jumper service on National Park Service lands .....	94,827:	941:	---
For participation in a soil and moisture conservation program and for snow investigations .....	19,109:	391:	---
For rehabilitation or relocation of national forest resources and improvements damaged or destroyed by activities of Department of the Interior agencies .....	17,060:	4,037:	---
Total, Department of the Interior.	130,996:	5,369:	---
<u>Department of Commerce, Public Roads Administration:</u>			
For investigation of applications, and construction, maintenance, and improvement of access roads to sources of raw materials .....	78,367:	109,618:	---
<u>Federal Power Commission:</u>			
For investigation and supervision of Federal Power Commission projects ..	1,624:	462:	---

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
Working Funds, Agriculture (Forest Service) (General Account) Advanced from: (Continued)			
Housing and Home Finance Agency:			
For program of investigations and re- search on building materials and systems .....	140,499:	12,233:	---
National Security Resources Board:			
To cover cost of conducting a forest products materials survey .....	6,702:	---	---
Post Office Department:			
To cover costs of developing packag- ing specifications for parcel post ..	---	20,000:	---
Rural Electrification Administration:			
For technical assistance on power line pole problems .....	13,696:	8,250:	---
Soil Conservation Service:			
For a snow survey in Montana .....	6,366:	314:	---
Total, Working Funds, Agriculture, Forest Service, General Account .....	1,069,396:	1,305,266:	---
Working Funds, Agriculture, General (Forest Service) Advanced from:			
Department of Defense, Department of the Army:			
For training Japanese agricultural leaders in the field of agriculture:	144:	456:	---
To cover the cost of providing data, in connection with a comprehensive survey of the Arkansas, White, and Red River basins, to the Corps of Engineers .....	32,252: 4,891:	a/ 4,348: ---	---
Department of Defense, Department of the Navy:			
For mapping strategic areas .....	53,523:	28,421:	---
Total, Working Funds, Agriculture, General .....	90,810:	33,225:	---

a/ Allotment as of December 31, 1950.



Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Working Funds, Agriculture, Forest Service, Special Fund:</u>			
<u>Advanced from Interior Department:</u>			
For installation of radio communica- tion equipment .....	618:	2:	---
For relocation of telephone lines ...:	53:	---	---
For snow investigations, Frazer experimental area .....	---	77:	---
For changing communication facilities: between the Swan Valley Ranger Sta- tion and the Alpine Guard Station ...:	1,578:	53:	---
Total, Interior Department .....	2,249:	132:	---
<u>Cooperative Work, Forest Service:</u>			
Trust fund deposited by cooperators for the accomplishment of certain pro- jects, which are of mutual benefit to Forest Service and such cooperators, as follows:			
1. Construction and maintenance of: roads and trails .....	497,945:	500,000:	500,000
2. Construction and maintenance of other improvements .....	417,520:	400,000:	400,000
3. Protection of national forest and adjacent private land .....	1,250,430:	1,400,000:	1,400,000
4. Sale-area betterment and scaling...:	1,936,131:	2,965,000:	3,065,000
5. Forest investigations .....	383,535:	425,000:	425,000
6. Administration .....	115,110:	120,000:	120,000
7. Reforestation .....	34,281:	40,000:	40,000
8. Brush disposal .....	1,040,896:	1,000,000:	900,000
9. Refunds to cooperators .....	222,470:	150,000:	150,000
Total, Cooperative Work .....	5,898,318:	7,000,000:	7,000,000
<u>Forest Service, State Rural Rehabilita- tion Corporation Funds (Trust Fund):</u>			
For administration of the El Pueblo grazing project and the Lobato Grant projects in New Mexico for the Farmers' Home Administration .....	13,166:	14,699:	6,129
<u>Forest highways, Bureau of Public Roads, : Department of Commerce (Transfer to Agriculture)(Forest Service):</u>			
For carrying out Forest Service respon- sibilities in the forest highway pro- gram .....	95,320:	91,700:	92,000

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Mutual Security, (Allotment to Agriculture) (Forest Service):</u>			
For expenses incident to the Foreign trainee program .....	8,030:	a/ 4,800:	- -
<u>Salaries and Expenses, Defense Production Activities, Agriculture (Forest Service):</u>			
For carrying out the provisions of the Defense Production Act of 1950 .....	164,408:	81,000:	- -
<u>Forest Roads and Trails, Forest Service:</u>			
Forest highways .....	2,963:	1,453:	- -
Development roads and trails .....	66,291:	23,662:	- -
(This represents balance of appropriations made for Forest roads and trails prior to 1950)			
Total, Forest Roads and Trails ....	69,254:	25,115:	- -
<u>Obligations under reimbursements from Governmental and other agencies:</u>			
Salaries and expenses b/ .....	4,545,771:	4,580,235:	4,581,235
Forest development - roads and trails, and roads and trails for States (permanent) .....c/ .....	370,668:	536,309:	537,309
All other .....	127,241:	13,400:	13,400
Total .....	5,043,680:	5,129,944:	5,131,944
TOTAL, OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS .....	19,242,513:	18,844,727:	19,122,697

a/ Allotment as of December 31, 1950.

b/ Represents primarily reimbursements from other appropriations of Forest Service and other Government agencies for rental of pooled equipment, and for sale of supplies and equipment usually of special design or packaging for field operations.

c/ Represents primarily sale of supplies and equipment to other appropriations of Forest Service (principally "fighting forest fires") and to other Government agencies.

FOREST ROADS AND TRAILS, EMERGENCY CONSTRUCTION, ACT OF JUNE 19, 1934

This appropriation was made as an employment relief measure in 1934 for the construction of roads and trails. The balance of \$39 remaining in the fund resulted from adjustments in vouchers covering payments made at the time the program was active. This balance will be returned to the Treasury in 1952.

CONSTRUCTION OF FOREST ACCESS ROADS TO STANDING TIMBER  
(Trust Fund)

In fiscal year 1947, \$10,900,000 was advanced by the Housing and Home Finance Agency, through the Reconstruction Finance Corporation, for the construction of access roads to national forest timber, under authority contained in section 11 of the Veterans Emergency Housing Act of 1946 (Act of May 22, 1946, Public Law 388). The unobligated balance of \$10,728 remaining in this account will be returned to the Treasury during fiscal year 1952.

FEDERAL SURPLUS COMMODITIES CORPORATION  
(NORTHEASTERN TIMBER SALVAGE ADMINISTRATION)

This schedule reflects a balance of \$483 remaining in the fund advanced by the Reconstruction Finance Corporation for timber salvage operations in New England following the hurricane in September, 1938. This balance will be returned to the Treasury during fiscal year 1952.





## PASSENGER MOTOR VEHICLES AND AIRCRAFT

Replacement of passenger motor vehicles. It is proposed to replace 126 cars in the fiscal year 1953. Practically all of the cars to be replaced will be of model 1947 or older with mileages in excess of 60,000 miles. The only exception to the practice of replacing older cars with mileages in excess of the standard, would be to replace cars involved in serious accidents or where operating costs become excessive. Most Forest Service cars are operated mainly over mountain roads where surfaces are rough and dusty, grades are steep and curves are numerous and sharp.

Aircraft. It is estimated that it will be necessary to purchase 1 helicopter and to replace one reconnaissance plane and one cargo plane in the fiscal year 1953. The planes to be replaced were acquired in 1945. Since Forest Service planes are operated in large part over rough mountain terrain, they should not be continued in operation unless they are completely airworthy. The estimated cost of the reconnaissance plane is \$12,000, and of the cargo plane for transporting smoke-jumpers, fire-fighters, and equipment and supplies for fighting forest fires, \$70,000. The helicopter has proven to be a very valuable tool in forestry, especially in fire control activities. Defense activities have seriously reduced the availability of privately owned-commercially operated helicopters. Contract and charter prices are becoming unreasonably high and frequently helicopters are not available when needed. In order to meet the needs of the service, it is proposed to purchase one helicopter at an estimated cost of \$50,000.





## FLOOD CONTROL, AGRICULTURE

### Purpose Statement

Flood Control Activities. The Flood Control activities of the Department are carried out pursuant to the Flood Control Act of June 22, 1936, as amended and supplemented. They consist of:

1. The preliminary examination and survey of watersheds authorized by the Congress for investigation and the preparation of survey reports setting forth the watershed conditions and recommending improvement programs, and
2. The installation of watershed improvement measures to retard run-off and waterflow and to prevent erosion which are included in improvement programs approved by the Congress.

The Forest Service and the Soil Conservation Service have been assigned the responsibility, on a territorial basis, for the investigation of watersheds and the preparation of flood control survey reports. The Bureau of Agricultural Economics, the Production and Marketing Administration, and other Federal agencies and State and local agencies are consulted as they have interests or can contribute to the development of recommended programs. When the recommended programs are approved by the Congress, the Department proceeds with installation of the authorized measures.

Watershed improvement measures to increase the infiltration of water into watershed lands, to retard and control run-off, and to prevent erosion and thus reduce sedimentation of stream channels and reservoirs are being installed on 11 watersheds for which the Congress has authorized improvement programs. This work is handled by the Forest Service and Soil Conservation Service, in cooperation with State and local agencies and land owners and operators.

General Basin Investigations. General Basin Investigation activities consist of the preparation of the agricultural phases of comprehensive, integrated resource development programs for the Arkansas-White-Red River, the Colorado River, and New England-New York areas pursuant to various provisions of law relating to the work of the Department.

Resource development programs for the Arkansas-White-Red River and the New England-New York areas are being developed cooperatively by concerned Federal agencies with appropriate State and local participation, under the Federal Inter-Agency River Basin Committee. By this procedure over-all programs are prepared for the development, use and conservation of all natural resources in the areas, which, after appropriate review by concerned Federal agencies and States, will be transmitted to the Congress for consideration. The agricultural program for the Colorado River area is to complement plans already prepared by other agencies for the development of irrigation and power resources of the river so that a complete program for development of the land and water resources of the river will be available for consideration of the Congress and in order that protection may be provided for main stream reservoirs by watershed treatment above reservoirs.

The Department, in cooperation with Federal and State agencies, is also continuing the preparation of an agricultural program for the Columbia Basin area under this and other funds available to the Department.

These programs are planned and are being carried out in close collaboration with the people in each area. Their purpose is to provide an effective means by which Federal activities can assist the people to beneficially use and conserve their natural resources and to fulfill local, regional, and national needs.

	<u>Estimated, 1952</u>	<u>Budget Estimate, 1953</u>
Appropriated funds	a/ \$7,262,097	\$7,750,000

a/ Includes \$702,497 available from prior year balances.

# FLOOD CONTROL, AGRICULTURE

Appropriation Act, 1952 .....	\$6,372,800
Supplemental appropriation for 1952 (Second Supplemental Appropriation Act, 1952) .....	186,800
Base for 1953 .....	<u>6,559,600</u>
Budget Estimate, 1953 .....	<u>7,750,000</u>
Increase (direct appropriation) .....	<u>+1,190,400</u>

Note: Although an increased appropriation of \$1,190,400 is requested for this item in 1953, it is estimated that there will be an increase of only \$487,903 in total funds available due to the availability of prior year balances of \$702,497 in the fiscal year 1952.

## SUMMARY OF INCREASES AND DECREASES, 1953 (On the basis of available funds)

Decrease for preliminary examinations and surveys (flood control) .....	-\$159,202
Increase for installation of works of improvement on authorized watersheds (flood control) .....	+446,698
Increase for General Basin Investigations in the Colorado River area .....	+200,000
Nominal increase in transfer to Office of the Secretary, rounding the amount to \$25,000 .....	+407

## PROJECT STATEMENT (Reflecting available funds)

Project	1951	1952 (estimated)	Increase or Decrease	1953 (estimated)
1. Preliminary examinations and surveys (flood control) .....	\$1,812,685	\$1,859,202	-159,202(1)	\$1,700,000
2. Works of improvement (flood control) .....	6,644,393	5,109,842	+446,698(2)	5,556,540
3. General Basin Investigations .....	- -	250,000	+200,000(3)	450,000
Transferred to:				
"Salaries and expenses, Office of the Secretary of Agriculture" .....	25,000	24,593	+407	25,000
"Salaries and expenses, Office of the Solicitor, Department of Agriculture" .....	17,000	18,460	- -	18,460
Total pay adjustment costs .....	- -	[369,883]	[+20,968]	[390,857]
Total available or estimate .....	8,499,078	7,262,097	+487,903	7,750,000

(Continued on next page)



Project	1951	1952 :(estimated):
Transfer in 1952 estimates to General Services Administration .....	+\$2,200:	- -:
Prior year balance available in 1951 ...	-3,088,775:	- -:
1951 balance available in 1952 .....	+702,497:	-\$702,497:
Reduction pursuant to Sec. 1214 .....	+4,200,000:	:
Total appropriation or estimate .....	10,315,000:	6,559,600:

#### INCREASES AND DECREASES

The net increase of \$487,903 in estimated obligations under this item for 1953 consists of the following:

(1) A decrease of \$159,202 for Preliminary Examinations and Surveys. Flood Control survey activities will be curtailed where such action will result in a minimum of loss of investment already made and of impairment of the total program. The current and proposed survey work is directed primarily toward those watersheds where basin-wide resource development studies are needed or are under way.

Within the total funds estimated for preliminary examinations and surveys for the fiscal year 1953, assistance will be provided the Missouri Basin Survey Commission, established by Executive Order 10318, dated January 3, 1952. The Commission will study the land and water resources of the Missouri River Basin and their utilization, the relevant plans and programs of governmental and other agencies and interested groups, including projects and programs now in operation or under development. The Commission will prepare recommendations for an integrated and comprehensive program for the development, use and protection of the land and water resources of the Basin.

(2) An increase of \$446,698 for Works of Improvement. The funds would be used to install watershed improvement measures that retard run-off and water-flow and prevent erosion and so reduce floodwater and sediment damages in the eleven watersheds for which improvement programs were authorized by the Flood Control Act of 1944, as amended. The following table indicates the estimated obligations for watershed improvement work in 1952 and 1953.

Progress in Carrying Out Authorized Watershed Improvement Programs through  
F.Y. 1951 and Estimated Obligations, Fiscal Years 1952 and 1953, under FLOOD CONTROL

Watershed and Total Number of Years to Complete Installation	Total Estimated Fed- eral Cost of Auth- orized Improvements	Based on : Survey : Reports (as of : of about : 1949)	Estimated : Cumulative : (Federal) :	Estimated (Federal) Obligations F.Y. 1952	Estimated (Federal) Obligations F.Y. 1953	Total	FS	SCS	Total	
										(1)
Buffalo Creek (N.Y.)	(18)	2,581,400:	4,517,450:	840,209:	- -:	200,391:	- -:	230,000:	230,000	
Colorado, Middle (Tex.)	(20)	2,693,000:	4,712,750:	678,604:	- -:	194,724:	- -:	210,000:	210,000	
Coosa (Ga., Tenn.)	(20)	1,233,000:	2,157,750:	402,008:	11,541:	88,177:	14,000:	140,000:	154,000	
Little Sioux (Ia., Minn.)	(15)	4,280,000:	7,490,000:	3,807,634:	- -:	639,853:	- -:	725,000:	725,000	
Little Tallahatchie (Miss.)	(20)	4,221,000:	6,856,500:	1,121,868:	116,353:	378,028:	134,000:	380,000:	514,000	
Los Angeles (Calif.)	(10)	8,380,000:	16,399,250:	4,631,517:	372,044:	149,624:	413,260:	189,000:	602,260	
Potomac (Md., Va., Pa., W. Va.)	(24)	859,000:	1,431,000:	401,760:	20,029:	87,870:	18,000:	95,000:	113,000	
Santa Ynez (Calif.)	(10)	434,000:	1,831,500:	946,971:	112,366:	176,069:	115,000:	170,000:	285,000	
Trinity (Texas)	(15)	32,000,000:	55,999,000:	4,649,816:	- -:	1,027,510:	- -:	1,200,000:	1,200,000	
Washita (Okla., Tex.)	(15)	11,243,000:	19,675,250:	4,478,471:	- -:	668,946:	- -:	840,000:	840,000	
Yazoo (Miss.)	(20)	21,700,000:	31,024,250:	1,551,616:	116,368:	509,949:	167,000:	516,280:	683,280	
Emergencies 1/		- -:	- -:	308,593:	45,000:	195,000:	240,000:	- -:	- -:	
Total		89,624,400:	152,094,700:	23,819,067:	793,701:	4,316,141:	2/5,109,842:	861,260:	4,695,280:	2/5,556,540

- 1/ Use of Flood Control funds to safeguard lives and property from floods and products of erosion on watersheds suddenly impaired by fire or other natural causes is authorized by Sec. 216 of the Flood Control Act of 1950.
- 2/ Excludes transfers to Office of the Secretary and Office of the Solicitor in connection with this work as follows:  
1952, \$18,497; 1953, \$18,700.



Land owners and operators within untreated portions of these 11 watersheds continue to suffer repeated and cumulative flood water and sediment damages to crops, livestock, farm lands and other property. They are ready and anxious to participate in the installation of needed measures because of the benefits received in saving valuable land and needed crops. Some measures have been installed within portions of each of these 11 watersheds each year since 1947 with good results. On untreated portions of the watersheds, erosion and floodwaters have caused further damages since the survey reports were completed so the improvement job has become bigger and hence more expensive. The longer the work is delayed, the greater will be the cost of installing effective measures and the longer their benefits will be delayed. The benefits of increased agricultural production and of stabilized production capacity are needed during the present defense emergency. The increase is urgently needed to help make progress toward getting the required measures installed.

(3) An increase of \$200,000 for General Basin Investigations for the preparation of the agricultural phases of a resource development program for the Colorado River area in cooperation with other Federal, State and local agencies. In the Colorado River area plans have been prepared by other Government agencies for the development of irrigation and power resources of the river. This Department proposes to develop a comprehensive agricultural program for the area to complement these plans. This is essential in order that a complete program for development of the land and water resources of the area will be available for consideration by the Congress and in order that protection may be afforded main stream investments by watershed treatment above reservoirs. The increase is necessary to get this work under way. The data gathering and program development work would be carried out in each area by representatives of agencies of the Department serving as work groups under the supervision of a Field Representative of the Office of the Secretary. The Department would cooperate closely with representatives of other concerned Federal and State agencies.

#### CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

1 Flood control: For expenses necessary, in accordance with the Flood Control Act, approved June 22, 1936 (Public Law 738), as amended and supplemented, to make preliminary examinations and surveys, and to perform works of improvement, and to plan the agricultural phases of the development of the Columbia Basin area, the Arkansas-White-Red River area, [and] the New England-New York area, the Colorado River area, and the Missouri River area, in accordance with the provisions of laws relating to the activities of the Department, including not to exceed \$100,000 for employment pursuant to the second sentence of section 706(a) of the Organic Act of 1944 (5 U.S.C. 574), as amended by  
2 section 15 of the Act of August 2, 1946 (5 U.S.C. 55a), at rates for individuals not to exceed \$100 per diem, to remain available until expended, [\$6,372,800] \$7,750,000, \* \* \* Provided further,  
3 That of the funds available herein, not in excess of [\$6,000,000] \$5,556,540 (with which shall be merged the unexpended balance of



funds heretofore made available for these purposes) may be expended in watersheds heretofore authorized by section 13 of the Flood Control Act of December 22, 1944, for necessary gully control, floodwater detention, and floodway structures in areas other than those over which the Department of the Army has jurisdiction and responsibility.

- 4 [Flood control: For an additional amount, in accordance with the provisions of the Flood Control Act of June 22, 1936 (Public Law 738), as amended and supplemented, to expedite investigations and surveys in critical areas in the Missouri and Upper Mississippi River watersheds and the submission of reports thereof to the Congress, \$186,800, to be merged with the appropriation made under this head in the Department of Agriculture Appropriation Act, 1952.]

The first change in language is proposed to authorize the use of funds appropriated under this item for developing the agricultural phases of programs for basin-wide resource development in the Colorado River and Missouri River areas as explained more fully above. Without such language the Department would be limited in the use of funds for assisting the Missouri Basin Survey Commission in work authorized under the Flood Control Acts. This language would permit the Department to provide the assistance contemplated in Executive Order 10318 under this appropriation in accordance with the provisions of the various laws relating to the activities of the Department.

The second change in language is proposed to provide authority to obtain the services of experts for consulting assistance on problems of a scope entailing specialized knowledge and experience beyond that obtainable from individuals at a grade allowable under the Classification Act. The Comptroller General has ruled that \$45.36 (Grade GS-15) per diem is the highest payable unless the Appropriation Act specifically provides for a higher rate (29 Compt. Gen. 267). This proposed change would authorize the employment of experts at rates not to exceed \$100 per day.

This recommendation stems from the need for designing and installing watershed works of improvement that are technically sound and adequate to meet problems of increasing complexity and which will prevent flood damages within practical limits under the intent and purpose of the Congressional authorizations.

For example, the upstream floodwater retarding structures in the Washita, Trinity and Middle Colorado river watersheds; the major gully control structures in the Little Sioux river watershed; and channel stabilization works in the Little Tallahatchie and Yazoo watersheds present problems having to do with stability of foundations, most economical safe designs of earth fills and spillways, and alternate designs or methods of treatment.

It is considered wise practice in the engineering profession, as in other professions, to utilize the services of specialists in a consulting capacity on new, unusual or especially important cases or problems which are encountered from time to time. The services of specialists of

recognized standing in the profession in foundation exploration and treatment, in soil mechanics principles and practice of earth dam design, in structural design of spillways, and in hydraulic problems of flood routing and stream flow are considered to be necessary in order to assure most economical construction consistent with expected performance. These are not now available to the Department under existing authorizations. Such consulting service on certain specific problems would help provide the soundest possible technical basis for principles and methods of handling similar problems in the future without requiring recurrent consultation. However, similar service on other unusual problems that may be encountered should be available as needed.

The objective is to assure that the works of improvement will be installed most economically and will function most effectively and safely consistent with the severity of the flood hazards and damages to be alleviated and with the soundest possible use of Federal and cooperator funds.

It is expected that the authority requested will be utilized only if it is determined in each instance that the kind of consulting services needed cannot be supplied from technical personnel within the Department or other Departments of the Federal Government or from State agencies or other groups which may be collaborating or cooperating with the Department in this work.

For the fiscal year 1953, it is estimated that the total of such services at the per diem rate indicated would not exceed 30 days.

The third change in language is for the purpose of changing from \$6,000,000 to \$5,556,540 the limitation on the amount which may be expended in authorized watersheds for gully control, floodwater detention, and floodway structures in certain areas. The revised limitation represents the amount requested for prosecuting works of improvement on authorized watersheds in fiscal year 1953.

The fourth change is for the purpose of deleting language included in the Second Supplemental Appropriation Act, 1952, appropriating \$186,800 for expediting the investigation and survey of critical areas in the Missouri and Upper Mississippi River watersheds.

The small watersheds for which survey reports are being prepared with these funds in 1952 are:

Illinois - Money Creek  
Tom Creek

Minnesota - Crow Creek, S. Fork  
Willow Creek

Iowa - Davids Creek  
Honey Creek  
Indian Creek

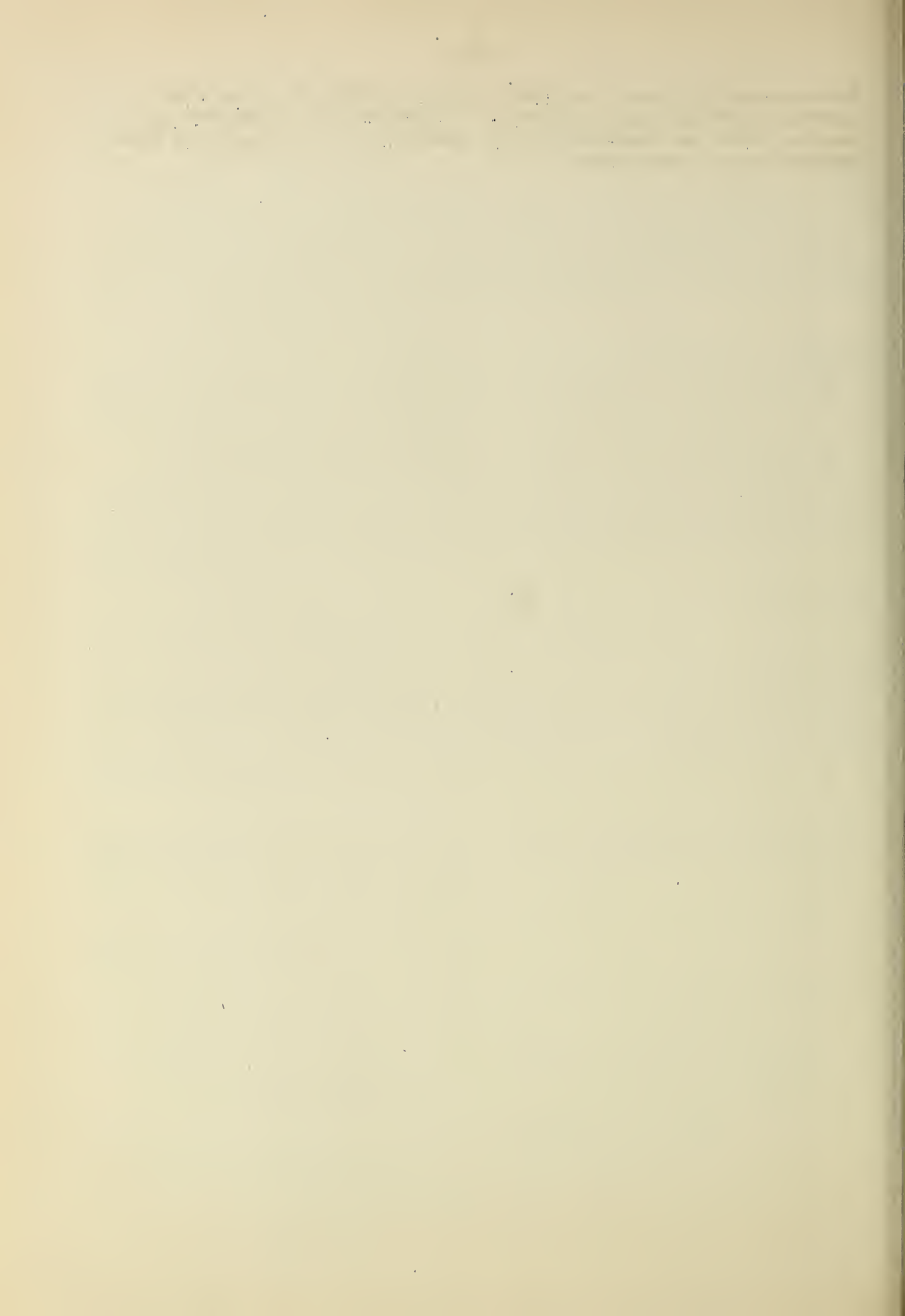
Missouri - Blackwater Creek,  
Upper Lost Creek

Kansas - Bills Creek  
Claussen Creek  
Little Delaware River  
Lost Creek  
Uehlin Creek  
Wolf Creek

Nebraska - Dry Creek

The preparation of these reports is being expedited so that, after approval by the Congress, measures to retard run-off and prevent soil erosion, which are essential for the protection of farm lands and other property, can be undertaken.





## STATUS OF PROGRAM

Objective: To reduce damages caused by floodwaters, erosion and sediment to agricultural and other property, particularly in the upstream areas, and to reservoirs on the mainstreams.

Method: By land use adjustment and watershed conservation and improvement measures to prevent erosion and to increase the amount of water temporarily stored in the soil and by the use of vegetation and small supplementary works to impound sediment, help control gullies and stabilize streambanks, and retard run-off and control its movement into the rivers.

Authorization: Pursuant to the provisions of the Flood Control Act of 1936, as amended and supplemented, the Department of Agriculture is assigned the responsibility for making preliminary examinations and surveys of watersheds authorized for investigation by the Congress, for preparing watershed survey reports recommending improvement programs, and for installing watershed improvement measures included in authorized programs.

### Progress with Preliminary Examinations and Surveys

Congress has authorized over 1,000 watershed investigations.

Congress has authorized and directed this Department to make some 1,060 investigations of watersheds or parts of watersheds under the Flood Control Acts. In various instances two or more authorizations are concerned with the same watershed, so the actual number of survey reports to be prepared and the number of watersheds involved is materially less than this figure.

The Department has completed preliminary examination reports on 178 watersheds and survey reports on 20.

Preliminary examination reports on 148 watersheds have recommended that surveys be made and 30 have not. Survey reports on 20 watersheds or groups of watersheds have been forwarded to Congress. Thirteen of these reports recommended programs of improvement and 7 did not. The Flood Control Act of December 22, 1944, as amended and supplemented, approved programs of improvement as recommended in 11 of these reports. The Congress is now considering the programs recommended for the Missouri River Basin and for the Green River in Kentucky.

Survey reports on other watersheds are now in final stage.

Preliminary examination or survey work was carried on in 1951 on 57 watersheds or groups of watersheds. Work is continuing on 35 of these and is scheduled for 19 additional watersheds in 1952. In several instances reports are being prepared on a group of several authorized watersheds. A similar approach may be followed in the future in other instances where it is feasible and more economical. During the fiscal year 1951 nine survey reports were forwarded to the Bureau of the Budget for consideration, one of which (Green River - Kentucky) has

been forwarded to the Congress this fiscal year. Eight other survey reports are now in the process of clearance with other Federal agencies and with the States and about 20 others are expected to be that status by early in 1952.

Authority is needed for installation of improvement measures on more watersheds.

The favorable results obtained from measures now installed on selected subwatersheds within the 11 authorized watersheds emphasize the importance and need to speed up the development of improvement programs and to obtain authority for their application in other drainage basins where floodwater, erosion and sediment damage to agricultural and other property is severe and where mainstream complementary works of the Corps of Engineers, Bureau of Reclamation and others need protection. Grouping of small watersheds for survey and reporting purposes wherever practicable helps to accomplish this.

Watershed and downstream program recommendations are correlated.

Program recommendations for watershed improvement are based upon hydrologic and economic data obtained by this Department, the Corps of Engineers and other Federal, State and local agencies and mutually shared by all to the extent it is applicable. Proposed improvements are correlated with and designed to protect mainstream works constructed by the Corps of Engineers and Bureau of Reclamation in addition to providing protection to the watershed lands and property above the mainstream works.

#### Watershed Works of Improvement

Reduction of floodwater and sediment damage begins where the rain falls - on watershed lands.

The Flood Control Acts provide for the reduction of flood and sediment damages, the prevention of soil erosion and the control of floods by a combination of watershed improvement measures and mainstream control works. Land use adjustments, soil and water conservation and forestry measures within the authorized watersheds increase the capacity of the soil to absorb and temporarily store water. They help to prevent erosion and to reduce the downstream damage to property and reservoirs by sediment. Gully control, floodwater retarding, sediment storage, streambank stabilization and other supplementary measures further assist in these functions and in the orderly routing of runoff from the land into the minor watercourses and down to the main streams where the Corps of Engineers has responsibility. The installation period for individual subwatersheds is customarily planned to cover two to four years. The period for entire watersheds is usually scheduled to cover from 10 to 30 years.



## Responsibilities for Watershed Improvement Work

The Forest Service and the Soil Conservation Service have been assigned responsibility for the installation of authorized watershed works of improvement in accordance with their respective specialist fields. They cooperate with local, State and Federal agencies with which they work on other related activities and with others concerned with this particular work.

### Watershed Improvement Work by the Forest Service.

The following principal physical works of improvement have been installed and major fire protection equipment items acquired for watershed improvement purposes under the Flood Control Acts by the Forest Service and cooperating State agencies.

Measure	Unit	Total Completed or Acquired		
		In 1951	In Prior Years	To 6-30-51
<u>Fire Protection</u>				
Roads (constructed or rebuilt)	Miles	39.5	13.2	52.7
Trails( " " )	"	84.3	21	105.3
Firebreaks	"	49.5	28	77.5
Telephone lines	"	22.2	15.3	37.5
Large water storage tanks	No.	18	41	59
Lookout towers	"	9	1	10
Fire crew station sites	"	1	5	6
Buildings for fire protection work (barracks, cabins, warehouses, garages, offices, misc.)	"	2	34	36
Pumps	"	2	11	13
Radios (mobile & stationary)	"	17	87	104
Fire trucks with equipment	"	9	15	24
Tractors	"	3	3	6
Plows	"	5	3	8
<u>Stabilization of Roadsides</u>	Miles	.5	75.8	76.3
<u>Revegetation-Cover Improvement</u>				
Seeding and planting--trees and shrubs	Acres	7,445	12,131	19,576
Soil stabilizing brush dams	No.	442	5,127	5,569
Emergency seeding following fire on ll authorized watersheds	Acres	—	1,500	1,500
<u>Mountain Channel Control</u>				
Barriers	No.	6	128	134
Planting	Sq. yds.	50,000	242,000	292,000
Channel clearing	Acres	—	29	29
Channel stabilization	Lineal ft.	781	—	781

The continued increase in local interest in the watershed improvement work, as, for example, in the Yazoo-Little Tallahatchie River watersheds testifies to its value. In these watersheds, in the fiscal year 1951, some 552 landowners, or 45 percent of those for whom farm plans were written that year, requested assistance in treatment and utilization of their woodlands. Over the entire life of the project 27 percent of those for whom farm plans have been written have requested such assistance. As an example of the benefits obtained, one owner made a thinning and improvement cutting upon advice of a project forester on 300 acres of woodland. In the two years which have since elapsed this stand has doubled its previous growth rate. The improved forest cover which resulted from this cutting contributes substantially to bettering the infiltration capacity of the soil. The accelerated timber growth "sells" to local landowners the desirability of conservative timber management, an essential accomplishment for bringing about the superior watershed condition that can be attained through good forest practices.

Approximately 11.4 million trees were planted on private land in the fiscal year 1951 in the Yazoo-Little Tallahatchie watersheds. The flood control project supplied 7.8 million and the State of Mississippi 3.6 million. These plantings are largely on the poorer gullied sites, and in a few years will contribute very materially to control of erosion in the watershed. Interest in tree planting has reached the point where the number of trees planted each year is limited by the number of trees available. For example, in Holmes County 949,000 trees planted amounted to less than 50 percent of the number requested by landowners. Nursery production for 1952 is aimed at production of 24 million trees.

Local bankers in Pontotoc County have recently offered to buy one or two mechanical tree planters to aid the planting program. The Illinois Central Railroad has furnished a mechanical planter in Tallahatchie County and has assisted in two planting demonstrations.

#### Fire Control important in Watershed protection and improvement.

Detailed plans for prevention of the destruction by fire of the vegetative cover needed for erosion control in the Yazoo-Little Tallahatchie projects are completed and being installed as rapidly as funds become available. The work is being carried out under cooperative arrangement with the State. Due to the fire prevention efforts of the project forester in Calhoun County, the annual occurrence of fire there has been cut from nearly 200 fires to an occasional fire, according to the State Forest Service. A feature of the fire protection project in Holmes County has been the construction by farmers of fire lanes 30-50 feet in width which are sown with grasses which prevent erosion and provide grazing for livestock. They remain green throughout the spring fire season.

Fire control installations in West Virginia in the Potomac River watershed are proceeding as rapidly as State funds are available to match Federal expenditures. Work has been completed in Virginia. In Pennsylvania and Maryland no fire protection work has been undertaken as it was found that cooperative protection under the Clarke-McNary Act, improved since the flood control survey report was prepared, has become adequate to meet flood control objectives.



A cooperative fire control project with the State of Georgia on the Coosa River watershed, recently established, has resulted in the construction of three fire towers, three-fourths of a mile of fire control road, and purchase and placing in operation of two small fire trucks with tools, six radios, two tractors, and four fire lane plows.

Intensification of the fire protection system for mountain lands in the Santa Ynez River watershed is approximately one-third completed. The plans for this work, which are completed, have been fully integrated with similar plans for protection of the areas of fire hazard in the adjoining Ventura, Santa Clara and Salinas River watersheds for which flood control survey reports are being prepared.

Emphasis in the Los Angeles River watershed has recently been placed on fire protection in the hazardous mountain areas and stabilization of mountain roads. Installation of fire protection facilities in the national forest area has continued. Housing for fire crews and equipment has been constructed and radio communications have been installed cooperatively with Los Angeles City and Los Angeles County. A project for erosion and runoff control on a major mountain highway for which plans were made several years ago has been completed. Channel control work in the fiscal year 1951 included the planting of vegetated waterways and the construction of several small channel barriers. Previously completed work includes different types of structural installations on several separate subwatersheds of the Arroyo Seco to test the relative effectiveness and economy of various control methods. Stabilization of some raw slopes in the watershed by vegetation has been keyed in with the channel control work in the Arroyo Seco.

As an example of the use of Flood Control funds for emergency watershed protection, \$13,000 was made available in the fiscal year 1951 to aid in reseeding a 15,000 acre burn which occurred in May 1951 in the headwaters of the Penasco River, New Mexico, which is not one of the authorized watersheds, to minimize potential danger from flood and sediment damage to agricultural lands and farm buildings. Also, in the current fiscal year, \$150,000 was made available for emergency channel restoration work in Kansas, Missouri and other Mid-western States which were stricken by the severe floods and extremely heavy rainfall in July, 1951.

#### Watershed Improvement Work by the Soil Conservation Service.

The Soil Conservation Service has assisted local soil conservation districts in the 11 authorized watersheds in planning and installing watershed improvement measures. Work plans have been developed for 557 subwatersheds covering watershed treatment for approximately 9,954,060 acres or about 33 percent of the 30,102,774 acres in the authorized portions of the 11 watersheds. The work planned thus far indicates that approximately 40 percent of the cost of installation will be borne by local interests and 60 percent by the Federal government. Installations have been completed in two subwatersheds in the Los Angeles watershed and in seven subwatersheds in the Little Sioux.



The following table Lists Works of Improvement which have been accomplished cooperatively by the Soil Conservation Service and local interests:

Measure	Unit	Planned as shown in sub-			Completed		
		In	In Prior	To	In	In Prior	To
		1951	Years	6-30-51	1951	Years	6-30-51
1. Upstream floodwater retarding structures	No.	173 (for: 537 (for: 710 (for: 28 (for: 37 (for: 65 (for	retarding:retarding:retarding:retarding:retarding:retarding:	of of of of of of	of of of of of of	of of of of of of	of of of of of of
		434,486 : 496,315: 930,801 : 14,299 : 10,367 : 24,666	acre ft.):acre ft.):acre ft.):acre ft.):acre ft.):acre ft.):				
2. Debris basins	No.	1,241	2,033:	3,274	490	1,030	1,520
3. Revegetation (critical flood and silt source areas where vegetative cover provides watershed protection)							
a. Grasses and legumes	Acres	88,961	437,100:	526,061	40,582	134,996	175,578
b. Woody plantings	Acres	41,019	65,621:	106,640	5,793	12,352	18,145
4. Tributary channel stabilization	Miles	648	1,234:	1,882	115	195	310
5. Minor waterways & channel improv.	"	158	304:	462	21	30	51
6. Diversions	"	51	341:	392	15	74	89
7. Gully control	Acres	29,361	27,842:	57,203	8,101	7,750	15,851
8. Roadside runoff & erosion control	Miles	496	1,323:	1,819	267	289	556
9. Terraces	"	1,127	11,262:	12,389	123	1,229	1,352
10. Other minor runoff and sediment detention structures	No.	254	1,637:	1,891	120	273	393

Progress during the fiscal year 1951 in terms of completed works of improvement in the 11 authorized watersheds exceeded that of any previous year. This was due primarily to two factors. First, the preparation of subwatershed work plans and of specifications has been pushed far enough ahead so that a substantially larger proportion of funds available could be devoted to installation of works of improvement. Secondly, the complete treatment of selected subwatersheds has made a profound impression on both the local people within the watershed areas and on visitors from all over the country. This has led to a marked acceleration in desire on the part of local groups in subwatersheds to seek assistance and to cooperate in the installation of works of improvement. The treatment of more than a score of subwatersheds was brought close to completion during the year.

Installation of flood control measures in the 11 authorized watersheds has led to a movement that is becoming of nation-wide import in furthering the watershed phases of flood control. Within less than five years scores of watershed associations have been organized by local people in more than a dozen States to further the assumption of local responsibility for watershed improvement. These associations are soliciting local, State and Federal aid from all available sources in a cooperative approach to starting the flood control job where the rain falls and controlling water and sediment movement through the small watersheds down to the larger streams. Outstanding proof of the benefits that watershed improvement measures contribute to the economy and welfare of the people of the Nation is evident in the results obtained during the year in the 11 authorized watersheds.

Accomplishments in the Yazoo and Little Tallahatchie River Watersheds illustrate value of Improvement Work.

Considerable damage to agricultural bottomlands has occurred as a result of flooding and sedimentation in the Yazoo River watershed. Tremendous volumes of sand are contributed to the Yazoo Delta by meandering and head-cutting tributaries of the Yazoo River. The Department of Agriculture's flood control survey revealed that 88 percent of the first bottomlands in the Little Tallahatchie drainage basin have been affected to some extent by physical changes due to sedimentation. An estimated 25.8 percent of these lands have been severely damaged. It was estimated in 1941 that sedimentation damage to agricultural land amounted to more than \$500,000 annually. This type of damage is 60 percent greater than the damage from floodwater alone. Similar damaging effects of sedimentation are evident on the minor watersheds in the Yazoo River Basin. Typical of these minor watersheds are those of Taylor and Jones Creeks.

The topography of the Taylor-Jones Creek watershed of 12,027 acres is steep and rough. The area was cleared for cotton and corn 20 to 40 years ago. Intensive cultivation and misuse of land during this period resulted in severe gullying with subsequent filling of stream channels and destruction of fertile bottomlands by floodwater, by deposition of infertile sediment on bottomland, and by creating swamp conditions. The farmers located in this minor watershed depend largely on the bottomlands as a source of cash crops.



The Soil Conservation Service is assisting the supervisors of the Northeastern Mississippi Soil Conservation District in carrying out the flood control and watershed treatment program on the Taylor-Jones Creek watershed. More than 95 percent of the farm owners in the watershed are cooperators with this district. As of June 30, 1951, works of improvement completed on the Taylor-Jones Creek watershed included 1,200 acres of gully control; 69 miles of highway erosion control; 64 desilting basins; 12 miles of channel improvement; more than 4 miles of diversion ditches or dykes; 1,348 acres planted to kudzu, lespedeza sericea and trees; improved woodland management on 2,762 acres; proper crop rotation on 1,217 acres; improvement of 1,463 acres of pasture, and many other measures. This work has been highly effective in preventing further amounts of sand and sediment from reaching the channels. As a consequence, the sediment-free water has opened up the old channels through scouring action until now they are deep and wide enough to carry the runoff water with less frequent overflow. Overflow has been reduced more than 50 percent and crop production has been almost doubled on the land which previously had been subject to periodic flooding. Many farmers who were unable to depend upon annual crops from their land in the flood plain are now successfully farming their bottomlands.

An indication of the benefits derived from works of improvement on this minor watershed is the fact that the average annual floodwater and sediment damage before treatment was \$52,700, while the average annual damage has now been reduced to \$33,400. Thus, the benefits from reduction in damage have already been \$19,300 annually. Also other benefits such as more intensive use of the flood plain and on-site benefits accruing from the works of improvement amount to an additional \$55,600 each year. Therefore, the total annual benefits from works of improvement thus far installed in this subwatershed amount to \$74,900 and forecast a substantial economic benefit to North Mississippi when the objectives of the improvement programs on the Yazoo and Little Tallahatchie watersheds are completed. The installation costs totaled \$142,972 (Federal = \$74,044; Farmer = \$50,529; Other = \$18,399). If converted to an average annual cost equivalent on the basis of average prevailing interest rates, plus the estimated average annual cost of operation and maintenance, the average annual cost would be approximately \$20,350 (Federal = \$1,851; Farmer = \$17,624; Other = \$876).



## PASSENGER MOTOR VEHICLES

The estimates for 1953 propose the purchase of six passenger motor vehicles and disposal of seven old vehicles resulting in a decrease of one. The number proposed for replacement, at an estimated net cost of \$6,300, constitutes approximately five percent of the total number of cars operated under this appropriation by the Forest Service and the Soil Conservation Service. These vehicles are used by personnel engaged in surveys and in the installation of works of improvement on authorized flood control projects. The cars proposed for replacement will all be at least six years old or will have mileage in excess of 60,000 miles at the time of their disposal.



## SOIL CONSERVATION SERVICE

### Purpose Statement

The Soil Conservation Service was established by the Act of April 27, 1935- (16 U.S.C. 590a-590f) and is the agency of the Department which provides technical aid in bringing about physical adjustments in land use that will conserve soil and water resources, establish a permanent and balanced agriculture, and reduce the hazards of floods and sedimentation. The Service carries on the following activities:

1. Makes research studies to determine the character, causes and extent of soil erosion and water loss under varying conditions and to develop, adapt, and improve conservation practices which will adequately protect the land and water resources of the Nation. This work is conducted in cooperation with State Agricultural Experiment Stations, and is closely correlated with the research programs of the agencies in the Agricultural Research Administration.
2. Provides technical and other assistance to locally-organized and locally-controlled conservation districts in the 48 States and the Territorial Possessions in developing conservation farm plans and applying planned practices. This assistance includes (a) making conservation surveys to determine the use-capabilities and needs of each acre of farm and ranch land, (b) technical assistance in developing and applying conservation farm plans which allow for the best possible use by the farmer or rancher of his land, labor, equipment, and financial resources, (c) loan of some special types of equipment not readily available to the farmer but needed to establish certain conservation practices, (d) grant of limited quantities of trees, new or improved strains of grass and legume seed, and other conservation plant materials, and (e) streamflow forecasts in the Western States (based on snow surveys) to provide for efficient seasonal utilization of water available for irrigation.

As of June 30, 1951, 2,373 conservation districts which covered approximately 84 percent of the total farms of the Nation, had been organized and were receiving assistance from the Service.

3. Under the authority of Title III of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1011-1012), carries on a development and management program on 74 land utilization projects which cover areas of sub-marginal land that were acquired by the Department. Revegetation and other development work is being done on these lands in accordance with their use-capability and needs, in order to prevent further damage, achieve proper land use and improve the agricultural economy of the communities affected. After development, the lands and facilities are made available for rental to local farmers and ranchers at equitable rates under specific use conditions. Of the revenue received from use of the land, 75 percent is returned to the Federal Treasury and 25 percent is paid to the counties in which the lands are located, to be used for school and road purposes. The Service is also responsible for settlement of boundary-dispute



claims on the Sebastian Martin Grant Lands in New Mexico (Act of August 11, 1945 (7 U.S.C. 1011 note)).

4. Under the authority of the Acts of May 10, 1939 (53 Stat. 685, 719), October 14, 1940 (U.S.C. 590y-z-10), as amended and supplemented, June 28, 1949 (Public Law 132) and September 6, 1950 (Public Law 760) carries on a water conservation and utilization program. The Service develops irrigated and irrigable land (both Government and privately owned) for efficient use of irrigation water, provides settlement opportunities for farm families through the sale of developed farm units, and assists settlers within the authorized water conservation project areas with their soil and water conservation and land-use problems. This work is being conducted on the five remaining active project areas in 4 Western States.
5. Makes preliminary examinations and surveys under authority of the Flood Control Act of 1936 (33 U.S.C. 701a), and by delegation from the Secretary of Agriculture. Where surveys show the necessity and feasibility and the work is specifically authorized by the Congress, watershed improvement measures are installed to retard runoff and reduce flood water and sediment damage. Installation of watershed improvement measures which affect farm and ranch lands are the assigned responsibility of the Service. These are being installed in eleven authorized watersheds in cooperation with local soil conservation, flood control, and other districts. The Service also assists in the preparation of comprehensive plans for the agricultural development of river basin areas.

The Soil Conservation Service maintains its central office in the District of Columbia, with the majority of its activities highly decentralized to seven regional offices, 48 State and 3 Territorial offices, 86 research locations, 26 nurseries, 5 water conservation projects and approximately 3,000 work unit offices which carry on the technical program and provide assistance for conservation districts, land utilization projects and flood control watershed areas.

As of November 30, 1951, the Soil Conservation Service had 11,474 full-time employees, 183 of whom are in Washington and the balance in the field, and 1,385 part-time employees who are generally employed in the field during the seasonal periods when there is need for additional assistance in applying conservation practices.

	Estimated, 1952	Budget Estimate, 1953
Appropriated funds:		
Salaries and expenses	\$56,974,991	\$60,740,000
Emergency channel restoration in flood-stricken areas	1,960,000	- - -
Water conservation and utilization projects	a/ 369,593	235,500
Total	59,324,584	60,775,500
a/ Includes \$154,093 available from prior year balances.		

Summary of Appropriations, 1952 and Estimates, 1953

Item	Total : estimated : available, : 1952	Budget : estimates, : 1953	Increase (+) or decrease (-)
Salaries and expenses, Soil Conserva- tion Service .....	\$58,934,991	\$60,740,000	+\$1,805,009
Water conservation and utilization projects, Soil Conservation Service	a/ 389,593	235,500	-154,093
Payments due counties, submarginal land program (Farm Tenant Act) ....	298,000	344,000	+46,000
Total .....	59,622,584	61,319,500	+1,696,916
Deduct permanent appropriation:			
Payments due counties, submarginal land program .....	298,000	344,000	+46,000
Total, direct annual appro- priation .....	59,324,584	60,975,500	+1,650,916

a/ Includes \$154,093 available from prior year balances.

(a) Salaries and Expenses

Appropriation Act, 1952 .....	\$53,474,991
Supplemental appropriation for 1952, (Flood Rehabilitation Act, 1952) .....	1,960,000
Anticipated pay adjustment supplemental .....	3,500,000
Base for 1953 .....	58,934,991
Budget Estimate, 1953 .....	60,740,000
Increase .....	<u>+1,805,009</u>

SUMMARY OF INCREASES AND DECREASES, 1953

For soil and water conservation and engineering investigations in reclamation areas .....	+130,000
To provide farmers in reclamation areas with conservation surveys and land capability maps, and other technical assistance needed to plan and establish conservation practices	+400,000
For technical and other assistance to new conservation districts in planning and establishing soil and water conservation practices .....	+3,028,000
To provide additional technical assistance to those conservation districts which have a large workload of conservation planning and treatment and have received only limited assistance ....	+467,009
Decrease due to providing a direct appropriation to the General Services Administration for certain leasing and building main- tenance costs previously paid from this appropriation .....	-100,000
Decrease due to elimination of item provided in the Flood Rehabil- itation Act, 1952, for emergency channel restoration in flood stricken areas .....	-1,960,000
Decrease due to partial absorption of pay adjustment costs ...	-160,000

PROJECT STATEMENT

Project	1951	1952 (estimated)	Increase or Decrease		1953 (estimated)
			Pay adjustment: absorption:	Other	
1. Development and improvement of soil conservation practices and techniques ..	\$1,480,918	\$1,584,000	-\$6,000	+\$130,000(1)	\$1,708,000
2. Assistance to soil conservation districts and other cooperators .....	51,556,288	54,133,991	-145,000	+3,795,009(2)	57,784,000
(a) Planning, application and maintenance of conservation practices ..	(49,877,499)	(52,483,991)	(-140,000)	(+3,690,009)	(56,034,000)
(b) Operation of nurseries for conservation plant material .....	(1,678,789)	(1,650,000)	(-5,000)	(+105,000)	(1,750,000)
3. Development and management of land utilization projects .....	1,276,964	1,257,000	-9,000	- -	1,248,000
4. Emergency channel restoration in flood stricken areas .....	- -	1,960,000	- -	-1,960,000(3)	- -
Subtotal ...	54,314,170	58,934,991	-160,000(4)	+1,965,009	60,740,000
Unobligated balance .....	a/ 626,462				
Total pay adjustment costs .....	- -	[3,985,852]	[ - - ]	[+424,148]	[4,391,000]
Total available or estimate ..	54,940,632	58,934,991	-160,000	+1,965,009	60,740,000

a/ Includes \$265,000 in 1952 specifically for reconstruction of the spillway on Greenleaf Lake in the Cookson Hills Land Utilization Project in Oklahoma.

(Continued on next page)



Project	1951	1952 (estimated)
Transferred to		
"Operating		
expenses, Gen-		
eral Services:		
Administration"		
pursuant to		
Reorganiza-		
tion Plan No.:		
18 of 1950 ..:	+1,343:	- -
Reduction pur-		
suant to Sec.:		
1214 .....	+520,000:	- -
Comparative		
transfer to		
"Salaries and:		
expenses,		
Office of In-		
formation,		
Agriculture".:	+3,200:	- -
Anticipated pay:		
adjustment		
supplemental.:		-3,500,000:
Total appropri-		
ation or		
estimate .....	55,465,175:	55,434,991:

#### INCREASES AND DECREASES

The net increase of \$1,805,009 in this item for 1953 consists of the following:

- (1) An increase of \$130,000 under the project "Development and improvement of conservation practices and techniques", to conduct soil and water conservation and engineering investigations in reclamation areas.

Need for Increase: There have been large Federal reclamation projects recently constructed and others are now being constructed in the Columbia, Missouri, Colorado and Rio Grande river basins which will bring several additional millions of acres of land into cultivation under irrigation. Much of this land is in the marginal rainfall belt where little irrigation research work has been done and where sound irrigation practices have not yet been developed. The projects all have soil conditions and topography peculiar to their areas which present difficult farming problems. In the Southwest, water supplies are very limited and the development of sound water conservation measures is mandatory. Irrigation water use-efficiency is a problem on all the projects. Large amounts of valuable irrigation water are being lost annually in conveyance and through improper application to the land. This is also causing serious land damage as soil fertility is being reduced through leaching, topsoil is being lost through erosion, and large areas of land have been and will have to be retired from cultivation because of drainage problems. Solutions must be found to the erosion and irrigation engineering problems of each project if continued productivity of the lands is to be assured.

It is a part of the basic and continuing responsibility of the Department of Agriculture to do the research and provide the technical aid needed on these agricultural problems in order to protect the large investments of the Federal Government and the project settlers in those new irrigated farms.

Plan of Work: The studies for which these funds are requested would be carried on in cooperation with the Bureau of Plant Industry, Soils, and Agricultural Engineering, Bureau of Agricultural Economics, and the respective State experiment stations.

The research work of the Soil Conservation Service under this increase would consist primarily of studies of the irrigation water requirements of each area, methods of water application, seepage problems, and drainage. The project areas involved and the major problems involved in each are as follows:

1. Columbia River Basin (Headquarters - Moses Lake, Washington)
  - a. Erosion (steep slopes)
  - b. Water loss by deep percolation on pervious soils
2. Riverton Project - Big Horn River (Headquarters - Riverton, Wyoming)
  - a. Impervious soils - slow infiltration
  - b. Highly pervious sandy soils over which it is difficult to transport water
3. Kendrick Project - North Platte River (Headquarters - Kendrick and Riverton, Wyoming)
  - a. Impervious soils - slow infiltration
  - b. Severe drainage problems
4. Oahe (Missouri River) and Angostura (Cheyenne River) Projects (Headquarters - Huron, S. D.):
  - Oahe Project
    - a. Waterlogging
    - b. Impervious soils - slow infiltration
    - c. Erosion (steep slopes)
  - Angostura Project
    - a. Drainage
    - b. Impervious soils - slow infiltration
5. Frenchman - Cambridge Project - Republican River (Headquarters - Arapahoe, Nebraska)
  - a. Impervious soils - slow infiltration
  - b. Irrigation requirements in marginal rainfall area
6. Welton-Mohawk and Yuma Mesa Projects - Lower Colorado (Headquarters - Yuma, Arizona)
  - a. Deep percolation
  - b. Loose erodible soils
  - c. Underground erosion

7. Tucumcari Project - Pecos River (Headquarters - Tucumcari, New Mexico)

- a. Irrigation methods on steeply sloping lands
- b. Impervious soils - slow infiltration

Although there would be some laboratory and plot studies, the major activity would be on "development" farms (selected cooperatively by the Agricultural research agencies and the Bureau of Reclamation) where engineering research work can be done on a farm scale. A small staff of irrigation engineers and necessary part-time aides would be assigned to the designated projects and adequate facilities and equipment provided.

(2) A net increase of \$3,795,009 consisting of:

- (a) An increase of \$400,000 to provide farmers in reclamation areas with conservation surveys and land capability maps, and other technical assistance needed to plan and establish conservation practices.

Need for Increase: The Federal Government has constructed and has under construction a large number of reclamation projects in the Western States which will make irrigation water available for several million additional acres of land. Settlers on these projects are confronted with difficult land-use and water management problems with which they need technical help. There are wide differences in soils, topography, climate, amount and quality of water, need for supplemental water (marginal rainfall belt), crops, etc. between these reclamation projects and many of these differences exist within a particular project area. Separately and in combination these factors pose farming problems which require the aid of specially trained technicians. Otherwise farmers must resort to "trial and error" irrigation farming which is often costly both in labor lost and damage to land resources.

The Service is now providing some assistance to farmers in reclamation projects that are in soil conservation districts. However, the workload is heavy and additional technicians are needed to speed up the planning and layout of proper irrigation systems and establishment of sound cropping practices. Other reclamation projects are new or in the process of construction and not yet included in organized soil conservation districts, but help is urgently needed by the new settlers. The Federal Government has a large investment in these projects and needs to be assured of their success. The continued productivity of large areas of some of these projects depends upon technical assistance being furnished to the farmers immediately.

Plan of Work: Additional technicians and aides would be employed and assigned to areas within the irrigation projects where help is most urgently needed. Physical examinations would be made of the soil and the use-capability of each acre of land determined. Irrigation systems would then be planned to fit the needs of each farm and technical assistance provided in laying it out on the land and getting conservation farming practices established.

- (b) An increase of \$3,028,000 for technical and other assistance to new conservation districts in planning and establishing soil and water conservation practices.



Need for Increase: The urgent need for carrying on a nationwide program of soil and water conservation and sound land use is generally recognized. Various Federal and State agencies, farm organizations, bankers, educators, technical societies, conservation groups, etc. have carried on a constant conservation education program. This has brought to the attention of the people of the country, and especially the farmers and ranchers, the value of conservation farming and the need for organized action to combat waste of the nation's soil and water resources.

Soil conservation districts have continued to organize steadily although there was some slowing down in 1951 primarily because no technical assistance could be expected. It is urgent that funds be provided for assisting new conservation districts with their conservation programs. The present rate of land treatment must be increased if permanent damage to hundreds of thousands of acres of valuable agricultural land is to be prevented. As of June 30, 1951 there were 2,373 conservation districts in the United States and its possessions. It is anticipated that an additional 150 will be organized in the fiscal year 1952 and another 125 in the fiscal year 1953. The increase requested would permit the Service to place on a full-year basis in 1953 the assistance (75 district-years) being furnished to the 150 districts being organized in 1952 and to furnish part-time assistance (62 district-years) to the 125 districts expected to be organized in 1953.

Plan of Work: Funds requested would provide for 137 district-years of assistance at a rate comparable to the average district assistance being furnished in the fiscal year 1952. Technicians and aides would be employed as rapidly as possible and given specialized training. They would be assigned to the new districts as they are organized and as soon as their programs and work plans are completed. Technical and other assistance would be given in making conservation surveys and land capability maps, in preparing conservation farm plans, and in establishing planned soil and water conservation and land-use practices.

(c) An increase of \$467,009 to provide additional technical assistance to those conservation districts which have a large workload of conservation planning and treatment and have received only limited assistance.

Need for Increase: Although the rate of land treatment is being increased each year, the soil and water conservation job is not being done fast enough to prevent permanent damage annually to hundreds of thousands of acres of good farm and ranch land. More technical help is needed. Within the Service constant effort is being made to increase production. In the past ten years the annual rate of land treatment has been increased by 379 percent with an increase in staff of only 62 percent. Further increase in efficiency is expected, but the backlog of work and need for assistance is so great that additional technical staff is needed.

There are two particular problems which need special attention. First, no additional funds were provided in the 1951 and 1952 appropriations for assistance to new districts organized in those fiscal years. The assistance furnished to these districts is necessarily limited in most cases because it can be provided only by drawing on the already inadequate staffs of the older districts which actually need additional technical help to speed up land treatment and prevent irreparable damage to large

areas of land. The second problem is the constantly increasing backlog of requests from farmers and ranchers for technical and other assistance in planning and establishing conservation practices on their land. Districts report approximately 200,000 applications on hand for which no assistance has been furnished.

Good progress has been made in land treatment, but the total job to be done is an immense one. Of 2,373 conservation districts organized as of July 1, 1951, 1,874 still have less than 25 percent of the required conservation treatment completed. It is urgent that additional resources be provided for this important work.

Plan of Work: Funds requested would provide a resident technician for those districts which are now receiving only part-time assistance. Additional assistance would be furnished where conservation needs are greatest and where there is a large backlog of requests for assistance on file.

(d) A decrease of \$100,000 due to providing a direct appropriation to the General Services Administration for certain leasing and building maintenance costs previously paid from this appropriation.

(3) A decrease of \$1,960,000 due to elimination of item provided in the Flood Rehabilitation Act, 1952, for emergency restoration of channel capacity and related rehabilitation measures in flood stricken areas.

Operations under this emergency appropriation were started during the latter part of November. The disaster areas involved are located in Illinois, Iowa, Kansas, Missouri, Nebraska, and Oklahoma. The rehabilitation work to be done includes removing debris blocks, cleaning out drainage ditches and stream channels, and constructing channel, bank, and gully stabilizing structures. Some jobs have been completed and contracts are being let for others. Surveys of severely damaged areas are continuing and detailed plans being prepared as the basis for letting additional contracts. Rehabilitation work is being prosecuted as rapidly as possible.

(4) A decrease of \$160,000 due to partial absorption of pay adjustment costs.

#### CHANGES IN LANGUAGE

The estimates include proposed changes in the language as follows (deleted matter enclosed in brackets):

- 1 \* \* \* [Provided further, That not to exceed \$265,000 of funds authorized for fiscal year 1951 for development of land utilization projects may remain available until expended:] Provided further, That qualified local engineers may be temporarily employed at per diem rates to perform the technical planning work of the service,
- 2 [Soil Conservation Service: For an additional amount for salaries and expenses, \$1,960,000, for emergency restoration of channel capacity in tributary stream channels and waterways, and related measures, affecting more than individual farms, in agricultural areas, damaged by excessive rains, runoff, and floodwaters, designated by the Secretary of Agriculture as disaster areas under Public Law 38, approved April 6, 1949.]

The first change in language is for the purpose of deleting the provision contained in the 1952 Appropriation Act continuing until expended not to exceed \$265,000 of the funds appropriated for fiscal year 1951 for development of land utilization projects. This provision applied to the funds specifically appropriated in 1951 to reconstruct the spillway on Greenleaf Lake in the Cookson Hills Land Utilization Project in Oklahoma. Retention of the language for 1953 is not necessary. An agreement has been entered into with the Department of the Army for this work and the funds have been made available to that Department by working fund advance.

The second change in language is for the purpose of deleting the language provided in the Flood Rehabilitation Act, 1952, which appropriated an additional amount of \$1,960,000 in the fiscal year 1952 specifically for emergency restoration of channel capacity and related rehabilitation measures in flood stricken areas.



## STATUS OF PROGRAM

### DEVELOPMENT AND IMPROVEMENT OF CONSERVATION PRACTICES AND TECHNIQUES

#### Current Activities:

##### Need for Continuous Research Program

Studies are made to determine the character, causes, effects and extent of soil and water loss under varying conditions and to develop, adapt, and improve conservation farming practices and methods which will adequately protect the land and water resources of the nation. The objective of the Soil Conservation Service program of assisting farmers and ranchers to plan and apply conservation is to treat each acre according to its individual needs and use the land in accordance with its capabilities. Newly organized conservation districts which add work areas and problems; new soil, water, and land-use problems which arise in normal field operations; and the continually changing needs of agriculture require the constant efforts of an adequate research staff if sound and permanent conservation is to be achieved. Research activities are conducted in the general fields of erosion control, drainage and water control, and irrigation and water conservation in cooperation with the State Agricultural Experiment Stations.

##### Steps in Developing Conservation Practices

Development and improvement of soil and water conservation practices is accomplished by:

1. Laboratory and plot work to develop basic information
2. Experiment Station field scale trials of practices
3. Adaptation and testing of practices for application over extensive areas

The last step is carried out in close cooperation with the "Operations" Staff which is working on the planning and application of conservation practices on the land. Successful practices developed are incorporated into the regular soil and water conservation programs of the Service.

Selected Examples of Recent Progress:

Stubble Mulch Farming

Tillage practices which are designed to leave a large proportion of stubble on or near the surface have been found to provide outstanding protection from wind and water erosion. In general the methods developed show that nitrates are reduced somewhat under mulch and that legumes and applied **nitrogen** are necessary to overcome yield depressions.

Studies in eastern Nebraska show sweetclover to be one of the best legumes in a corn rotation where the stubble mulch system is used, although there is indication that annual legumes such as vetch, partridge peas, and lespedeza may give satisfactory results. Addition of nitrate fertilizer has further increased the yield from 97 bushels per acre to 106 bushels per acre.

In the Palouse wheat belt of Washington, moldboard plowing after destruction of stubble lost 18.1 tons of soil and moldboard plowing after leaving the residue lost 10.7 tons, while subsurface tillage with one ton of straw lost 3 tons and with two tons of straw lost only 1.5 tons of soil.

In South Carolina the studies of the past eight years have produced practices which utilize the residue of rye-vetch or crimson clover as a winter cover crop, and have reduced runoff in the corn season by 72 percent and soil losses by 83 percent.

Soil Pitting in Pastures

In Wyoming, pastures that were pitted with an eccentric disc as a soil and water conservation measure in 1942, continued in 1950 to carry 35 percent more sheep while leaving more than 40 percent more grass on the land compared with unpitted pastures. For an investment of 25 to 50 cents an acre, a return of 11 pounds of animal gain can be obtained. As a result of these studies pitting has become a commonly accepted improvement practice on the plains of this State.

In Arizona, pasture pitting has increased production 2 to 5 times, while seeding with Lehman, Boer or Williams lovegrass in conjunction with pitting has increased production as much as 10 times. In some cases, suitable moisture conditions for germination for the lovegrass seed have not occurred until the second and third season after seeding. Yet the seeds have remained viable during this time and have produced good stands as long as three years after planting.

Value of Topsoil

In Missouri, a fertilizer and land management treatment that increased yield of soybeans 13 bushels an acre on land having 8 1/2 inches of topsoil gave only a 5-bushel increase on land having 2 inches of surface soil.

Studies in five counties in southwest Missouri show that past erosion has reduced land productivity equivalent to cutting a 100-acre farm down to a 50-acre holding. Fields selected for study were uniform except for the remaining depth of surface soil. Oats used as the index crop yielded 45.1 bushels an acre where erosion had been only slight to moderate, 36.5 bushels where the erosion was moderate to severe, and 21.5 bushels where the erosion was severe.

#### Hydrologic Studies of Conservation Practices on Small Watersheds

At Coshocton, Ohio, tentative results show that small watersheds with conservation practices (contoured corn and good sod crop, in rotation) has 40 percent less runoff, 81 percent less soil loss, and 34 percent less nitrate loss than untreated (straight row) watersheds. When mulch was added and surface sealing was reduced, runoff was 66 percent less, soil loss 95 percent less, and nitrate loss 83 percent less than on the untreated watersheds. Conservation practices were found to have had an immediate effect on erosion, reducing it by approximately 80 percent the first year and with continuing small reductions in succeeding years. The effect of these practices on crop yields was found to be a gradually increasing one, varying from a decrease of 19 percent the first year, to a 13 percent increase the 5th year and 38 percent increase the 9th year.

#### Fescue for Claypan Soils

In Missouri, alta fescue is proving to be a valuable new plant for pasture farming on claypan soils. The first seeding of this species was made at McCredie in the fall of 1946. It is easy to establish, grows well with legumes, remains green later in the fall than other grasses, and gives good response to soil treatments, especially nitrogen. Grazed in the regular grazing season, it has produced beef gains equal to Kentucky Bluegrass with comparable treatments. Its greatest value, however, lies in its use as winter pasture. Managed for this purpose, seed and hay crops may be removed in mid-summer, or they may be grazed until late August. Growth after September 1 is accumulated for late fall and early winter grazing. A 5-acre field of fescue produced 471 pounds of recleaned seed and 1.64 tons of hay per acre in 1950. It carried 13 head of yearlings for 55 days, beginning December 1. They gained just under 1/4 pound per head per day. Monetary value of production (seed, hay, and hay saved by winter grazing) total \$288.42 per acre. The plot had ample mineral fertilizer and received 100 pounds of ammonium nitrate per acre fall and spring.

#### Sedimentation Investigations

At Lincoln, Nebraska, studies were made to determine the effects of floodwater scour and sediment deposition on the productivity of flood-plain lands. Measurements of corn yields from small plots located on Hooper Creek near Palmyra, Nebraska, indicated an average yield of



58 bushels per acre on scoured areas, 84 bushels per acre on areas covered with sediment, and 68 bushels per acre on regular floodplain soils. Similar relationships were found in measurements of plots on Salt Creek flood plain near Hickman, Nebraska. This information will be used in connection with evaluation of floodwater and sediment damages on downstream lands in this area.

### Supplemental Irrigation

Supplemental irrigation studies, conducted on Lloyd clay loam soil near Auburn, Alabama during 1950, showed that the application of 4 inches to 11 inches of irrigation water did not increase the yield of cotton sufficiently to pay the cost of irrigation. However, sprinkler irrigated plots planted to corn, on which 9 inches of water were applied during the season gave a yield of 101 bushels per acre compared with a yield of 50.9 bushels per acre for unirrigated check plots.

In New Jersey, four water applications were made on areas in sweet corn during the 1950 season. These areas include sweet corn on both continuously-cultivated land and on land in a 3-year rotation with a grass-legume sod. Irrigation of continuously-cultivated land resulted in increased soil and water losses and did not increase the crop yield. The soil and water losses did not occur however, during the application of irrigation water but from rains occurring after the soil moisture content from irrigation was high. On land in regular rotation with sod crop, yield without irrigation was much higher than that either with or without irrigation on continuously-cultivated land. When irrigation was used on the well-managed soil in sod rotation, further yield increases were obtained.

### Wind Erosion

A portable wind tunnel has been successfully developed and its practical use has been demonstrated in determining the effectiveness of land treatment for preventing wind erosion. Experiments conducted show that susceptibility of soils to movement by wind tends to be much greater in the spring than in the fall due to breakdown of clod structure and decrease in vegetal and residue cover during the winter period. Emergency tillage, wherever the soil surface was roughened mechanically to bring a greater proportion of non-erodible clods to the surface, had an immediate effect in reducing the erodibility of bare soil.

Wind erosion field tests at Amarillo, Texas, and at Lincoln, Nebraska, showed that use of a stubble mulch system on wheat land has been the least erodible of the various cultural practices for wheat production. Land that was fall plowed following the 1949 wheat crop eroded at the rate of 60,000 pounds per acre during the spring 1950 while soil loss from a portion of the same land that was subtilled was only 280 pounds per acre. The two land conditions resulting from tillage and residue management varied widely in surface roughness, surface residues and clod structure, all of which notably affect soil erodibility by wind.

### New Type Channel for Small Waterways

Hundreds of small grass lined channels of various types have had to be constantly maintained and often rebuilt because of difficulty in keeping a good grass lining wherever a constant trickle of water occurs. The Stillwater, Oklahoma, Outdoor Hydraulic Laboratory has completed tests on a grass-lined channel with a small concrete chute down the center which will eliminate this problem. A procedure was developed whereby the hydraulic factors determined by the tests could be utilized in the design of like structures for the discharge of various quantities of water, making the use of the new type of combination channel applicable over a large area. Since high velocities found in the concrete gutter section do not carry over to the grass section, a concrete apron along the gutter edges is unnecessary.

### Irrigation Practices

In eastern Oregon and central Idaho along the Snake River, the soils brought under irrigation have been found to be slowly permeable with extremely low infiltration rates. The slowness with which the water entered these soils has made irrigation difficult with excessive loss from runoff at the ends of the field ditches. Irrigation studies carried out in these areas have shown that the plants take most of their moisture out of the first foot of soil and draw upon very little water below 3 feet in depth. It was found that the current practices of applying irrigation water on farm fields caused runoff losses exceeding 30 percent and deep percolation loss of more than 20 percent. Studies show that by establishing the proper relationship between the size of the stream, the length of the run, and the slope as related to the permeability of the soil, the efficiency of irrigation can easily be raised to 60 or 70 percent under practical farm conditions.

### Improvement of High Mountain Meadows

Preliminary results of studies initiated two years ago to determine the best water management practices for the high mountain meadows of Colorado and Wyoming show that:

1. Continuous irrigation for the production of hay and forage results in low yields of grass of less desirable species and poor food value.
2. The water table should be kept at least two feet below the ground surface to enable the forage plant roots to develop properly.
3. Intermittent water applications adjusted to the available moisture supply give the best plant development and the highest yields of forage.
4. Under a proper system of water management hay and forage crops on the upland meadows respond vigorously to fertilizer applications.



### Increased Storage of Underground Water

In many areas in which ground water is the principal source of supply, the demand and seasonal pumping has caused the lowering of the water table to such an extent that the entire source of water is placed in jeopardy. To fully utilize the underground beds as storage reservoirs, it is necessary to find the capacity of these strata. Hundreds of thousands of acre-feet of water which annually run into the sea or evaporate in inland lakes, should be stored in underground beds. Research conducted in the San Joaquin Valley, California has produced two practices which will allow continued high infiltration rates on water spreading areas. These are (1) adding an amendment to the soil, the best of which is cotton gin trash, and (2) planting the area to Bermuda grass. These methods are now being tested on a field scale to determine if they will allow the same high infiltration rates.

### ASSISTANCE TO SOIL CONSERVATION DISTRICTS AND OTHER COOPERATORS

#### Current Activities:

The planning and establishment of soil and water conservation measures on farm and ranch lands is generally carried on in cooperation with soil conservation districts. These conservation districts are local units of Government organized under State laws and responsible to the land-owners and operators in the districts and to the State legislatures. They are founded upon the sound principle of local initiative, direction, and control and are formed only in response to the petition and favorable referendum vote of the land owners and operators who are carrying on agricultural operations within the proposed district boundaries. Conservation districts have been organized in all 48 States, Hawaii, Alaska, Puerto Rico, and the Virgin Islands.

The following types of assistance are being furnished to conservation districts in carrying out locally-adapted programs of soil and water conservation:

1. The services of soil scientists who make the necessary physical inventories of the land to secure data (soil type, degree of slope, character and extent of erosion, present land use, etc.) needed to determine the use capabilities and conservation needs of each acre of land.
2. The services of soil conservationists, engineers, and other agricultural specialists and aides who help farmers and ranchers develop and apply individual conservation farm or ranch plans. (Soil and water conservation practices included in such conservation plans allow for the best possible use of the farmer's land, labor, equipment, and financial ability to do conservation farming on his land.)



3. The use of special equipment needed to facilitate establishment of conservation practices but which is of a kind that is beyond the purchase ability of an individual operator or for other reasons not readily available to the farmers and ranchers within the conservation district.
4. The grant of limited quantities of trees, new or improved strains of grass seed, and other plant materials which serve to control erosion and also have economic value.
5. In the Western States, streamflow forecasts -- developed from snow surveys -- which serve as a basis for efficient seasonal utilization of water available for irrigation and other purposes.

In cooperation with other Federal and State agencies, limited assistance is also given to farmers and ranchers outside conservation districts. This assistance develops a better understanding locally of erosion and land-use problems and encourages more widespread adoption of conservation farming methods.

In addition, the Service has the responsibility for the technical phases of permanent types of soil conservation work both within and outside districts, which is undertaken under the Agricultural Conservation Program administered by PMA.

#### Selected Examples of Recent Progress:

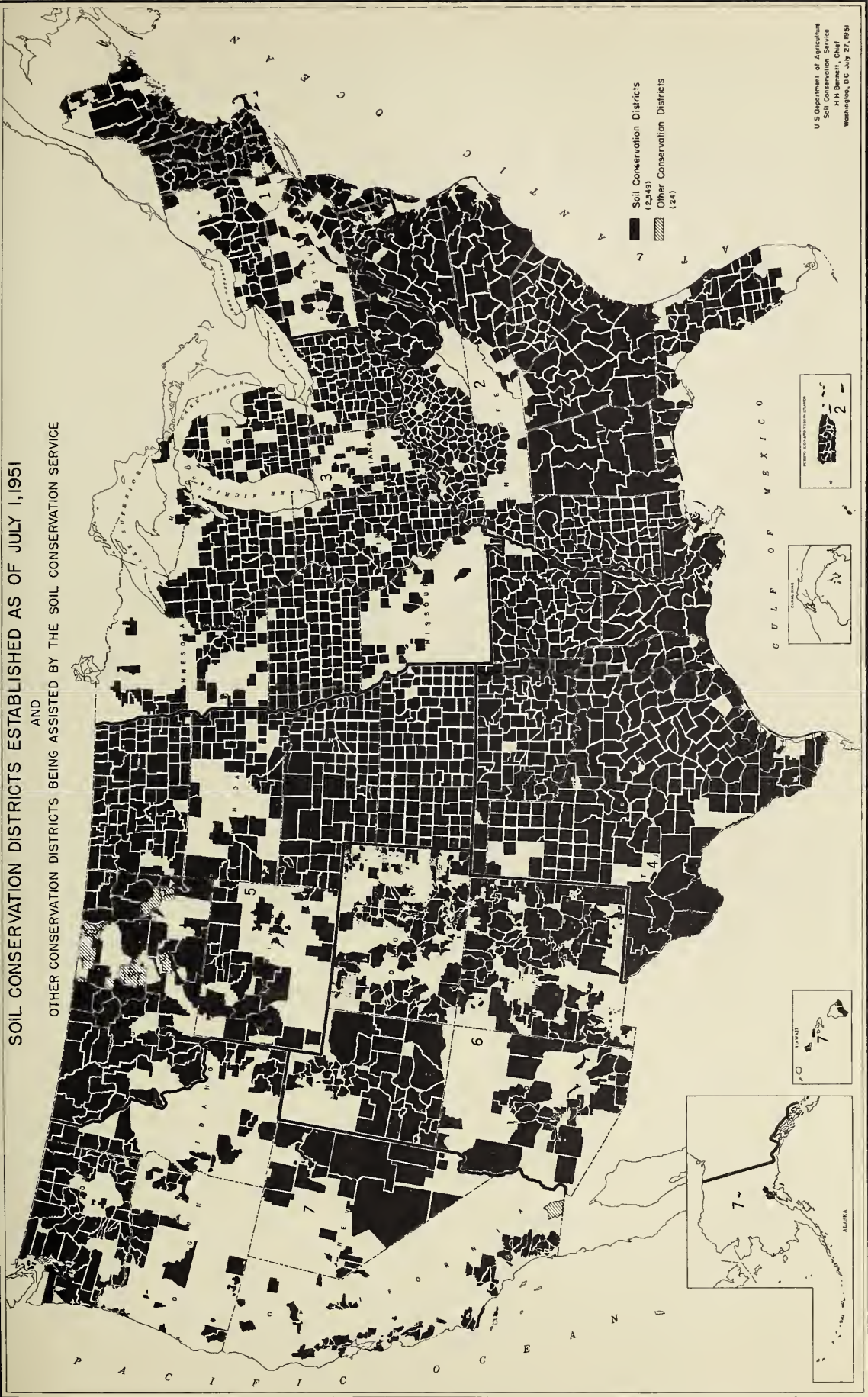
##### Rate of Organization of Conservation Districts

During the fiscal year 1951 local farmers and ranchers organized 88 new conservation districts and 190 additions to existing districts comprising in all nearly 52 million acres. As of June 30, 1951 the 48 States and Territorial possessions, all of which have enacted soil conservation district legislation, had organized a total of 2,373 conservation districts covering an area of over 1-1/4 billion acres. Approximately 84% of the total farms in the nation are now within the boundaries of organized conservation districts with 10 States and 2 Territorial possessions completely covered by such districts. It is anticipated that there will be 150 new districts organized in 1952 and 125 additional districts are forecast for 1953 which will bring the total number to 2,648 with over 90 percent of the nation's farms included within district boundaries.

The attached map shows the conservation districts which had been organized as of July 1, 1951.

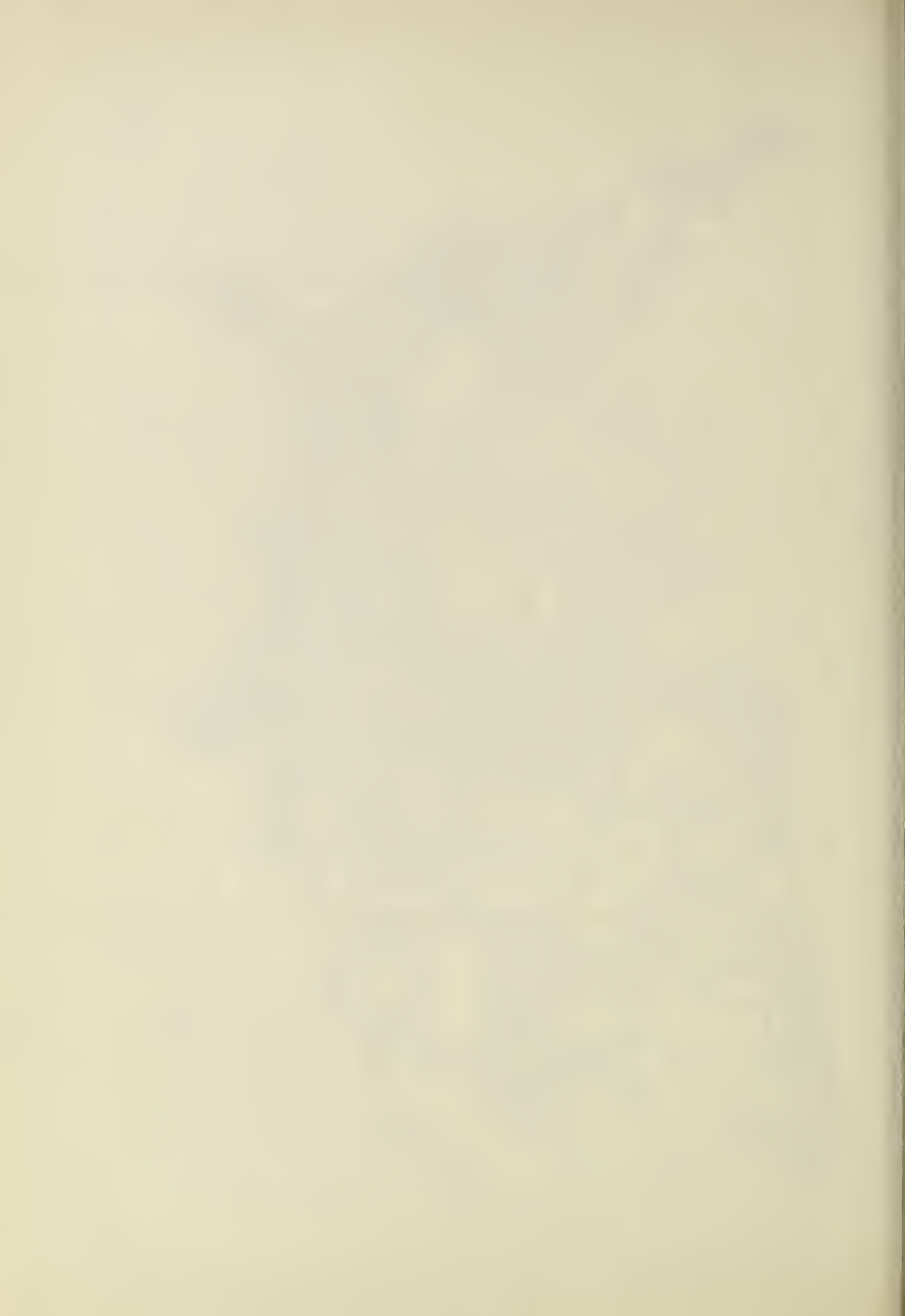


# SOIL CONSERVATION DISTRICTS ESTABLISHED AS OF JULY 1, 1951 AND OTHER CONSERVATION DISTRICTS BEING ASSISTED BY THE SOIL CONSERVATION SERVICE



U.S. Department of Agriculture  
Soil Conservation Service  
R. H. Bennett, Chief  
Washington, D.C. July 27, 1951





Number of Farms and Acreage in Conservation Districts

Date	: Number of : : Districts : : Organized :	Total Acres : in Organized : Districts :	Approximate : Acres : in Farms :	Number of : Farms in : Districts :
<u>Actual</u>	:	:	:	:
June 30, 1950	: 2,285	: 1,253,483,926	: 841,870,872	: 4,771,635
Average per district	:	: 548,571	: 368,434	: 2,088
June 30, 1951	: 2,373	: 1,305,110,000	: 874,036,479	: 4,886,487
Average per district	:	: 549,983	: 368,325	: 2,059
<u>Estimated</u>	:	:	:	:
June 30, 1952	: 2,523	: 1,387,600,000	: 929,284,000	: 5,195,000
Average per district	:	: 549,980	: 368,325	: 2,059
June 30, 1953	: 2,648	: 1,456,350,000	: 975,325,000	: 5,452,000
Average per district	:	: 549,980	: 368,325	: 2,059

Conservation Surveys, Planning and Treatment  
Accomplishments

Type of Work	: Unit :	Actual : 1951	Cumulative : to 6/30/51:	Estimated : 1952	1953
Conservation surveys ..	: Acres:	35,181,686	376,323,538	38,000,000	44,346,000
Individual farm and ranch plans .....	: Number:	128,502	1,000,699	140,000	167,000
Farm and ranch planning .....	: Acres:	36,259,299	275,116,643	38,500,000	45,925,000
Conservation treat- ment .....	: Acres:	25,596,642	140,404,405	26,000,000	30,605,000

Districts Costs and Accomplishments

Item	Obligations	Accomplishments (Acres)	Cost per Acre
<u>Fiscal Year 1951</u>			
Conservation surveys .....	\$3,940,578	35,181,686	\$0.11
Farm and ranch conserva-			
tion planning .....	15,612,669	36,259,299	0.43
Conservation treatment.....	29,013,430	25,596,642	1.13
Improvement and maintenance			
of program on farms			
and ranches .....	<u>2,992,844</u>		
Total obligations ...	51,559,521		
<u>Fiscal Year 1952 (Estimated)</u>			
Conservation surveys .....	4,155,829	38,000,000	0.11
Farm and ranch conserva-			
tion planning .....	16,465,500	38,500,000	0.43
Conservation treatment .....	30,356,337	26,000,000	1.17
Improvement and maintenance			
of program on farms			
and ranches .....	<u>3,156,325</u>		
Total obligations ...	54,133,991		
<u>Fiscal Year 1953 (Estimated)</u>			
Conservation surveys .....	4,438,536	44,346,000	0.10
Farm and ranch conserva-			
tion planning .....	17,585,592	45,925,000	0.38
Conservation treatment .....	32,388,832	30,605,000	1.06
Improvement and maintenance			
of program on farms			
and ranches .....	<u>3,371,040</u>		
Total obligations ...	57,784,000		



Land Treatment in Conservation Districts

The following table shows some of the major conservation practices that were applied in conservation districts with technical assistance furnished by the Soil Conservation Service:

Name of Practice	Unit	Applied during		Cumulative to June 30, 1951
		Fiscal Year: 1950	Fiscal Year: 1951	
Contour farming	Acres	3,491,511	3,185,039	25,678,134
Cover cropping	Acres	3,111,387	2,809,720	16,122,902
Stubble mulching	Acres	7,140,297	6,893,178	41,786,837
Strip cropping	Acres	829,200	880,383	6,584,904
Seeding pasture and range	Acres	1,876,832	2,306,365	9,332,913
Woodland management	Acres	3,391,551	3,068,859	16,209,929
Tree planting	Acres	126,784	167,435	781,225
Farm and ranch ponds	Number	37,780	37,843	215,435
Terraces	Miles	100,612	78,006	791,551
Diversion channels	Miles	5,892	5,420	30,991
Farm drainage	Acres	1,161,402	1,173,582	6,237,941
Irrigation land preparation	Acres	315,519	384,690	1,537,148
Improved water application	Acres	617,606	616,371	3,419,847
Field windbreaks	Miles	1,435	1,635	10,022

1/ These data are for first-time application only and do not include duplication of acreage for reapplication or maintenance of those same practices year after year.

### National Interest in Conservation of Soil and Water Resources

That soil and water conservation and proper land use is essential to the maintenance of a permanent agriculture is becoming more widely recognized each year. Farmers, industrial concerns, civic organizations, business and professional men, educators and others have sponsored the following local, State, and National conservation events as a means of furthering the action program of conservation districts.

1. A national tire and rubber company has for five consecutive years sponsored a contest in eight States in which the best conservation farmers and the most active conservation district governing bodies in each State received recognition for their work. This year the company has extended the contest to an additional nine States making a total of nearly a half million farmers and district supervisors who will be eligible for competition in the contest.
2. A national chemical company and the National Association of Soil Conservation Districts sponsored a written speech contest for conservation district supervisors in the United States on the subject "What My Soil Conservation District Has Done For Me". Thousands of speeches which were vivid testimonials of conservation accomplishments were judged in the State contests which prefaced the national event.
3. In Oklahoma, the State Banker's Association and the local bankers sponsored sixteen achievement award banquets, at which over 4,000 people witnessed the awarding of certificates to 255 farmers for completion of the conservation program on their farms.
4. As a means of stimulating conservation, the State Chamber of Commerce in South Carolina purchased and distributed over 2,400 copies of the conservation bulletin "Our Land \* \* Our Spirit".
5. In Georgia the banks are sponsoring a pine tree planting program. Over 240 banks have agreed to purchase treeplanters to participate in a program designed to plant 100 million seedlings per year, starting with 60 million in 1951-52.
6. Over 33,000 conservation essays were written by high school students of forty-one States in competing for State and National prizes awarded by a national fertilizer company and a national farm organization.

### Group Action Speeds Drainage and Irrigation Work

That maximum results can be expected from a unified approach to many problems is evidenced by the "group" drainage and irrigation work done in conservation districts. The operating efficiency of small drainage and irrigation facilities and the benefits to the farmlands involved are directly dependent on the proper planning and installation of the necessary control measures, by all of the farmers or ranchers concerned.

During the past year 1,071 "group" drainage jobs were completed. These involved all or parts of 5,855 farms and benefitted 499,159 acres. As of December 31, 1950, 5,355 of these jobs had been completed at an average cost of \$3.87 per acre benefitted. Soil conservation technical assistance amounted to about 9 percent of the total or \$.34 per acre. Farmers cooperating with local conservation districts paid the remaining cost of construction. During 1950, 225 "group" irrigation jobs benefitting 5,707 farms were also completed in conservation districts with Soil Conservation Service technical assistance. The total cost of the 1,128 "group" irrigation jobs completed as of December 31, 1950 (21,865 farms and 1,067,600 acres benefitted) was about \$3,900,000. The technical assistance in planning and applying the irrigation measures which was furnished by the Soil Conservation Service amounted to about 11.2 percent of the total or about \$0.41 per acre. The farmers paid the remainder, amounting to approximately \$3,461,000.

#### Dividends from Grassland Farming

The returns from grassland farming, in addition to a reduction of soil and water loss, are contained in the following report on a South Carolina farm. In 1948 the hogs were dry lot fed and produced 12 pounds of pork per bushel worth \$.20 a pound or a \$2.40 return per bushel of corn. In 1949 the hogs were grazed on fescue and ladino clover pasture as well as being fed the corn. Records show that they produced 20 pounds of pork per bushel at \$.20 a pound or \$4.00 total return per bushel. At the prices quoted the grazing would be worth \$1.60 per bushel of corn fed or for 10 hogs per acre, a total return of \$160 per acre.

On the same farm 9 head of beef cattle were grazed on ladino clover for six months without any other feeding. The gain in weight amounted to 450 to 500 pounds per acre or an estimate of at least \$100 per acre.

In either of the above instances the return from a good quality forage is equal to or better than clean cultivated crops on comparable areas.

#### Conservation Education

In order to place an effective conservation program on the land, farmers, ranchers, and others must first be aware of the need and of the results and benefits of such a program. "Extension" soil conservationists (33 are employed cooperatively by the Soil Conservation Service and the Extension Service) are providing the leadership in educational activities in order to accomplish this objective. Additional assistance during the past year has been provided by individuals, organizations, and institutions as indicated by the following items:

1. The time devoted to soil and water conservation activities by county agents increased 6 percent, home demonstration agents 14 percent, and club agents 25 percent.



2. Colleges and universities in many States conducted summer short courses and conservation work shops for elementary and high school teachers.
3. In one county alone the superintendent of schools held meetings on conservation for 2,200 pupils and teachers, while in another county 400 students were enrolled in a newly established conservation course.
4. In one State, 125 4-H Club boys and girls were selected for attendance at the annual conservation camp as a result of their interest and activities in soil and water conservation.
5. Several hundred thousand 4-H Club members actively carried on soil conservation projects in competing for prizes awarded in a national contest sponsored by a tire and rubber company. Many of these projects provide a direct influence on the parents in applying a complete conservation program.

#### Snow Surveys and Water Supply Forecasting

Snow surveyors traveled 39,000 miles by snowshoe, skis, over-snow vehicle, and aircraft, on 1,151 snow courses in the high watersheds of the Western States in order to make 46,000 measurements of the water content of the snow cover. These measurements and the relationships between snow cover and runoff, permitted water supply forecasts at 260 stations and over 18,000 copies of these forecasts were provided to the water users including agricultural, power, industrial, municipal, and recreational. Severe drouth in areas of the Southwest, as well as serious floods in other areas, have indicated the value of accurate water supply forecasting. Advance warning of the probable water shortage in the draught area allowed planning which eliminated planting thousands of acres, thereby saving seed and tillage costs. On the Columbia River, the Corps of Engineers report a saving from flood damage during 1951 of \$1,600,000 as a direct result of advance information from snow surveys made by the Soil Conservation Service. Since 1947 the snow course network of the Service has expanded 25 percent while the cost per snow course has decreased 26 percent. During the same period, water supply forecasts requested and developed have increased 47 percent. The Federal contribution to this program in so far as it is carried on through the Soil Conservation Service is only 35 percent of the total cost. Local agencies and organizations contribute the balance.

#### Conservation Plant Material

During the past year the Service operated 26 nurseries for the production of new, improved or uncommon kinds of grasses or legumes, and for the production of trees and shrubs needed for conservation operations. Two of these are to be discontinued in the fiscal year 1952. The

planting material produced in Service nurseries is granted to districts which in turn make it available in small amounts to district cooperators in order to encourage the establishment of needed vegetative practices on their farms or ranches. An important part of the work of the Soil Conservation Service nursery personnel continues to be the supplying of technical information to farmers, nurserymen, agricultural workers, and seed dealers on the need for planting material for conservation districts, the necessity of proper source of seed and the proper harvesting, handling and storing, and the adherence to grading standards in order to supply quality stock. In addition to providing newly adaptable species and strains of grasses and legumes for domestic use, the Service has a leading part in the exchange of foreign and domestic seed and technical information useful in the propagation and utilization of improved plant materials for soil conservation.

Soil conservation district cooperators, in planning protective cover for their lands, are creating such a great need for vegetative planting material that production sources cannot keep pace with the demand. Commercial and State nurseries, conservation districts, and individuals are producing grass and legume seed, trees, shrubs, and other plants to be used in applying conservation measures. In Michigan alone the State nurseries produced 18 million trees, while in the same State over three hundred seed beds for production of seedlings were maintained by 4-H and FFA Club members. Five Wisconsin soil conservation districts, in cooperation with the State Conservation Department, Extension Service and others, planted 2,557,000 seedlings.

#### DEVELOPMENT AND MANAGEMENT OF LAND UTILIZATION PROJECTS

##### Current Activities:

##### Land Areas Administered

The Service develops and manages 74 submarginal land projects in 30 States and administers the leases on 33 other areas which are managed by State agencies. These projects cover 7,345,469 acres, acquired by the Department during the period 1938 to 1942, which had become submarginal or unsuitable for cultivation because of location, severe erosion, natural infertility, loss of productivity through misuse, or other physical factors. Approximately 600,000 acres of land administered by the Service are adapted to forestry development and management, 6,300,000 acres are best suited for grazing purposes and the remainder are suitable for cropping, wildlife, recreation and miscellaneous uses. Revegetation and other development work is being done on these lands in accordance with their use-capability and needs, in order to prevent further damage, achieve proper land use, and improve the agricultural economy of the communities affected. Also included in the



work carried on under this appropriation item is the settlement of certain boundary-dispute claims on the Sebastian-Martin Grant Lands in New Mexico.

### Land Development

Development work consists of applying erosion control measures, establishing vegetative cover on abandoned crop land, improving and seeding land which is suitable for grazing purposes, developing wells, springs and other stock water facilities, fencing pasture lands, tree planting, constructing roads, firebreaks, trails, lookout towers, telephone lines, and buildings, and occasionally the development of recreation facilities. Much of the land area has been developed and is being made available to local farmers and ranchers at equitable rates under specific use conditions, thereby enabling them to shift to a more sound land-use program on their own land and also produce supplemental income.

### Management of Land and Facilities

The management, maintenance, and protection of approximately seven million acres of land requires repair and upkeep of fences, stock water facilities, telephone lines, buildings, etc., handling of permits for use of the land for grazing, haying, cropping and timber harvesting, and patrolling of fire lanes and fire fighting. Recreational facilities are handled through concessionaires' contracts. There has been no land purchase since 1942 but exchanges of Government-owned land for private land are being made, where such transactions will round out economic operating units for both the Government and private owners.

### Selected Examples of Recent Progress:

#### Land Exchanges

General land purchases under the Land Utilization program were discontinued at the close of the fiscal year 1942. No new land purchases are contemplated during either of the fiscal years 1952 or 1953. However, applications continue to be received for the exchange of private lands for Government-owned lands. The following table shows the status of land exchange work:

Item	:	Cases	:	Federal Land		Private Land	
				Released		Acquired	
				Tracts	Acres	Tracts	Acres
Applications received 1951	:	47	:	103	23,806	84	28,373
Applications completed 1951	:	68	:	161	33,427	143	49,005
Applications pending 7/1/51	:	110	:	275	54,288	224	64,633
	:		:				



## Sebastian Martin Boundary Disputes

Settlement of claims to certain so-called Sebastian Martin Grant Lands, now a part of the Grant Lands Land Utilization Project, New Mexico, is also included in the work authorized to be carried on under this appropriation item. Under the provisions of Public Law 179, 79th Congress, the Secretary of Agriculture is authorized to settle disputed claims to these lands. Out of the possible 55 claims that may develop under Sec. 2 of the Act, a total of 40 parcels involving 211.35 acres have been returned to private ownerships. The remaining 15 parcels comprising 75 acres are now in process of determination as to eligibility for return. Under Section 3 of the Act, 32 tracts comprising 880 acres have been sold, 10 tracts comprising 161 acres are in process, and applications for sale of 51 additional tracts comprising 1,279 acres are expected. It is anticipated that with the exception of a few problem cases, this part of the program will be completed in the fiscal year 1952.

### Current Development Accomplishments and Workload

While good progress has been made in developing land acquired, much remains to be done. Efforts are being concentrated on types of development work which will properly protect the land, provide maximum benefits from their use by local people, and bring maximum cash returns on the Government's investment. Although early completion of the remaining development work is the primary objective, provision must be made annually to carry out an adequate maintenance and management program and thus protect the Government's investment to date.

The following table shows the actual amount of some of the more important items of development work completed during the fiscal year 1951, estimated amounts for fiscal years 1952 and 1953, and the estimated balance remaining to be done after June 30, 1953:

Type of Work	:	Unit	Actual	Estimated			Balance
			F. Y.	F.Y.	F.Y.		to
			1951	1952	1953		Complete
Seeding range and pasture	:	Acres	34,904	35,000	35,000		42,740
Seed bed preparation .....	:	Acres	25,703	30,000	35,000		9,144
Liming .....	:	Acres	1,321	1,500	1,500		17,700
Fertilizing .....	:	Acres	2,180	2,500	2,500		26,557
Mowing and brushing .....	:	Acres	6,484	6,500	6,500		18,173
Fencing .....	:	Miles	423	400	400		792
Stock water source .....	:	Number	139	125	125		171
Tree planting .....	:	Acres	2,249	2,500	2,500		73,231
Fireguards .....	:	Miles	124	100	100		383
Roads and trails .....	:	Miles	26	25	25		290
Administrative buildings	:	Number	11	5	5		32

### Use of Land Utilization Project Lands and Facilities

Land Utilization project lands and facilities are made available to local farmers and ranchers at equitable rates under specific use conditions. During the calendar year 1950, 7,878 use permits were issued to local farmers and ranchers. The following table shows the four major uses of the land in the calendar years 1949 and 1950:

Calendar Year and Use	: Number of : Operators Using	: : Acres Used	: Unit Measure of : Production
<u>1949</u>	:	:	:
Grazing .....	: 5,327	: 6,386,159	: 1,706,803 A.U.M.
Haying .....	: 511	: -	: 20,096 tons
Cropping .....	: 370	: 23,513	: -
Woodland production .....	: 543	: -	: 30,169,567 bd. ft.
<u>1950</u>	:	:	:
Grazing .....	: 6,156	: 6,336,916	: 1,608,690 A.U.M.
Haying .....	: 738	: -	: 27,024 tons
Cropping .....	: 316	: 10,981	: -
Woodland production .....	: 668	: -	: 33,088,809 bd. ft.

### Revenue Received from Use of Land Utilization Projects

The income from the Government-owned Land Utilization project lands administered by the Service amounted to \$1,021,430 for the calendar year 1950. Of this amount 25 percent or approximately \$255,358 was paid in lieu of taxes to the counties in which the lands were located. The following table shows the types of revenue and the amount received for each, for the calendar years 1949 and 1950:

Type of Revenue	: Calendar Year Receipts	:
	: 1949	: 1950
Grazing .....	: \$669,599	: \$622,029
Haying .....	: 12,637	: 22,899
Cropping .....	: 46,884	: 28,140
Building occupancy .....	: 4,219	: 2,932
Recreation .....	: 31,171	: 28,899
Mineral royalties .....	: 3,966	: 12,347
Easements .....	: 2,108	: 3,764
Forest products .....	: 150,596	: 279,502
Salvaged improvements .....	: 1,020	: 410
Sale of seed .....	: 2,324	: 13,520
Unclassified .....	: 1,296	: 6,988
Total .....	: 925,820	: 1,021,430

It is estimated that revenue from these projects will amount to approximately \$1,200,000 for the calendar year 1951 and \$1,375,000 for the calendar year 1952. Payments to counties in lieu of taxes would amount to approximately \$298,000 for 1951 and \$344,000 for 1952.

(b) Water Conservation and Utilization Projects

Appropriation Act, 1952 and base for 1953 .....	\$235,500
Budget Estimate 1953 .....	<u>235,500</u>
Change .....	<u>      </u>

Note: It is estimated there will be a decrease of \$154,093 in total funds available for this item due to availability of prior year balances of \$154,093 in fiscal year 1952.

SUMMARY OF DECREASES  
(On an available funds basis)

Decrease in funds available for development work, since no unobligated balance is anticipated at the end of fiscal year 1952 .....	-132,093
Decrease due to elimination of funds being used in 1952 for the acquisition of scattered tracts of land on the Eden Valley, Wyoming project .....	-22,000

PROJECT STATEMENT  
(On an available funds basis)

Project	1951	1952 (estimated)	Increase or decrease	1953 (estimated)
1. Land development .....	\$338,087	\$330,593	-\$132,093(1)	\$198,500
2. Land management, settlement and technical guidance .....	34,606	37,000	- -	37,000
3. Land acquisition .....	- -	22,000	-22,000(2)	- -
Subtotal .....	372,693	389,593	-154,093	235,500
Unobligated balance .....	154,093	- -	- -	- -
Total available or estimate ..	526,786	389,593	-154,093	235,500
1950 balance available in 1951..	-341,286	- -		
1951 balance available in 1952..	- -	-154,093		
Reduction pursuant to Sec. 1214:	+314,500	- -		
Total appropriation or estimate .....	500,000	235,500		

DECREASES

The decrease of \$154,093 in this item for 1953 consists of the following:

(1) A decrease of \$132,093 in funds available for development work, since no unobligated balance is anticipated at the end of fiscal year 1952.

Decreases in the Buford Trenton Project (-\$4,982), the Buffalo Rapids I Project (-\$486) and the Buffalo Rapids II Project (-\$7,446) are due to anticipated completion of these projects in fiscal year 1953. The remainder of the decrease (\$119,179), would apply to the Angostura, South Dakota project, the only project for which funds are available in 1952 for substantial land leveling operations. The Eden Valley, Wyoming project will



be held to the same level as 1952. The small staff available on this project will continue to work on preparation of the project sub-division pattern, layout of the water delivery system, and work necessary for eventual large-scale land development operations.

(2) A decrease of \$22,000 due to elimination of funds being used in 1952 for the acquisition of scattered tracts of land on the Eden Valley, Wyoming, project.

The Eden Valley project contains five tracts of land in which the Federal Government and the Wyoming Rural Rehabilitation Corporation have an undivided interest. Because of the enactment of Public Law 499, 81st Congress, which provides for the disposition of the assets of the State Rural Rehabilitation Corporations, it is necessary to dissolve this joint investment. There are also other scattered tracts owned by the corporation which are needed to complete the project as planned but which cannot now be developed as a joint venture. It is planned to acquire the corporation's interest in all of these tracts. As soon as the project development is completed, these lands will be sold to project settlers. No further purchase of land is expected to be necessary in subsequent years.

## STATUS OF PROGRAM

### Current Activities:

The Water Conservation and Utilization (Wheeler-Case) program is carried on cooperatively with the Bureau of Reclamation which has as its responsibility the construction of the primary water supply features such as dams, reservoirs and principal canals. The Soil Conservation Service is responsible for developing irrigated and irrigable project lands for efficient application and use of irrigation water; with providing settlement opportunities for farm families and veterans; and with securing efficient land use and conservation of soil and water resources on the farms developed.

### Land Development

Extensive land preparation is essential to the changing of dry farm and range land to a well designed and constructed system of irrigation farming which will prevent waste of soil and water resources and permit maximum use of available irrigation water. Development of irrigable land includes such activities as making detailed land classification and topographic surveys, clearing and leveling land, subdividing land into economic-sized units, and the construction of farm ditches, laterals, drains, and other water control structures.

### Land Management, Settlement, and Technical Guidance

This work consists of the protection and management of Government-owned or controlled lands and facilities and leasing of the farming units under specific use conditions, prior to development and disposal to private farmers. As project lands are developed they are sold to qualified farm settlers selected by a local advisory board. The selling price of the completed farm unit is based on the earning power of the land and is calculated to return to the Federal Treasury an amount not less than the reimbursable cost of development with interest at 3 percent over a 40-year amortization period. Technical guidance, to insure efficient irrigation and conservation farming methods, is furnished to operators of both the Government-owned and the privately-owned lands within the project area.

### Land Acquisition

The Service has been acquiring only such lands as are needed to readjust land ownership and operating unit patterns. Because of the enactment of P. L. 499, 81st Congress (Rural Rehabilitation Corporation Trust Liquidation Act), which restricts the use of properties or assets of the various State Rural Rehabilitation Corporations held in trust by the Secretary to expenses necessary to return the property, cash, or other assets to the Corporations, and for certain loans, it will be necessary in the fiscal year 1952 to purchase the Corporation's interest in the five tracts of land in the Eden Valley, Wyoming project which are owned jointly by the Federal Government and the Wyoming Rural Rehabilitation Corporation. Other scattered tracts owned by the Corporation and which are necessary to the success of the project are also being purchased in 1952. As soon as development of these lands is completed they will be sold to project settlers.

Recent Progress:

Of the 19 water conservation and utilization projects originally authorized for development, under the 1940 Department of the Interior Appropriation Act and the "Wheeler-Case" Act of October 14, 1940 as amended, 8 are completed, 3 are scheduled for completion in the fiscal year 1953, 2 are scheduled to be completed by 1958 and 6 are inactive due to inflationary land prices and other changes since they were authorized.

Estimated Obligations by Projects, 1952 and 1953

The following table shows, by project, the estimated obligations to be incurred in the fiscal years 1952 and 1953 under this program (balances of "Great Plains" funds are also shown in order to facilitate program analysis):

Project	1952 Estimated			1953 Estimated		
	"Wheeler-	"Great		"Wheeler:	"Great	
	Case"	Plains"	Total	Case"	Plains"	Total
	Funds	Funds		Funds	Funds	
Angostura .....	\$210,938	-	\$210,938	\$91,759	-	\$91,759
Buffalo Rapids I .....	5,000	-	5,000	4,514	-	4,514
Buffalo Rapids II .....	14,576	-	14,576	7,130	-	7,130
Buford-Trenton .....	20,079	\$19,596	39,675	15,097	-	15,097
Eden Valley .....	70,000	-	70,000	48,000	-	48,000
Total Direct						
Project Costs....	320,593	19,596	340,189	166,500	-	166,500
General Administration	69,000	-	69,000	69,000	-	69,000
Total Estimate.....	389,593	19,596	409,189	235,500	-	235,500

Development Accomplishments and Work Load

The following table shows some of the more important items of development work planned, the amount completed to date, and the amount remaining to be done:

Item	Unit	Total Develop-	Accomplished	Remaining to
		ment Planned	to 6/30/51	be done 7/1/51
Topographic surveys ....	acre	181,917	159,940	21,977
Land classification ....	acre	222,019	192,389	29,630
Unit subdivisions .....	no.	550	487	63
Clearing .....	acre	36,804	23,243	13,561
Leveling .....	acre	113,843	48,593	65,250
Farm laterals .....	mile	1,980	682	1,298
Farm drains .....	mile	560	293	267
Farm irrig. structures	no.	15,791	5,602	10,189



WCU Project Authorizations and Obligations through 6/30/51

Project Name	Present	Obligations through June 30, 1951			
	Project	"Wheeler-	"Great	Contri-	
	Authorization:	Case"	Plains"	buted	Total
		Funds	Funds	Funds	
Angostura .....	\$1,484,000	\$588,330	-	-	\$588,330
Balmerhea .....	569,000	-	-	-	-
Bitterroot .....	752,000	166,810	-	-	166,810
Buffalo Rapids I .....	535,000	90,999	\$209,952	\$224,405	525,356
Buffalo Rapids II .....	770,000	256,661	345,000	134,486	736,147
Buford-Trenton.....	1,094,000	30,824	743,411	264,838	1,039,073
Dodson .....	84,000	51,485	-	-	51,485
Eden Valley .....	1,795,924 <sup>a/</sup>	219,444	154,594	5,061	379,099
Intake .....	41,000	20,817	-	-	20,817
Mancos .....	473,000	366,880	-	-	366,880
Mirage Flats .....	687,300	479,157	170,000	36,837	685,994
Missoula .....	133,000	65,297	-	-	65,297
Newton .....	75,500	74,230	-	-	74,230
Post Falls .....	196,000	196,572 <sup>b/</sup>	-	-	196,572 <sup>b/</sup>
Rapid Valley .....	170,000	7,117	15,042	-	22,159
Saco Divide .....	480,000	-	405	-	405
Scofield .....	350,000	119,531	-	12,200	131,731
Total direct project					
costs .....	9,689,724	2,734,154	1,638,404	677,827	5,050,385
Project investigations					
and surveys .....	-	233,473	-	-	233,473
General administration					
Farm Security					
Administration .....	-	349,091	-	-	349,091
Office of Production	-	4,137	-	-	4,137
Office of the					
Solicitor .....	-	59,957	-	-	59,957
Soil Conservation					
Service .....	-	595,661	-	-	595,661
Total obligations					
through 6/30/51 ..	-	3,976,473	1,638,404	677,827	6,292,704

<sup>a/</sup> Current estimates for total cost of projects. Public Law 132, 81st Congress, 6/28/49, authorized expenditure of such funds as necessary to complete project.

<sup>b/</sup> Net obligations after deduction of residual value of equipment is \$186,750.

Status of Land Development and Farm Sales

Project	Date Authorized	Irrigable Acreage	Percent De- velopment Completed 6/30/51	Federally-Owned Tracts	
				Number 1/	Number Sold
Angostura .....	March 6, 1941	16,180	14	105	-
Bitterroot .....	March 22, 1944	18,630	8**	-	-
Buffalo Rapids I ...	May 15, 1940	14,507	99	110	101
Buffalo Rapids II ...	May 15, 1940	10,400	99	123	80
Buford-Trenton .....	Sept. 23, 1939	14,729	88	156	131
Dodson *	March 17, 1944	1,200	100	-	-
Eden Valley .....	Sept. 18, 1940	20,000	16	70 2/	-
Intake *	Jan. 20, 1944	825	99 **	-	-
Mancos .....	Oct. 24, 1940	10,000	54 **	2	2
Mirage Flats .....	March 30, 1940	12,000	100	112	112
Missoula *	May 10, 1944	900	100	-	-
Newton *	Oct. 17, 1940	2,225	100	-	-
Post Falls .....	Jan. 29, 1944	3,260	90 **	17	17
Rapid Valley .....	Nov. 8, 1939	12,000	00 **	-	-
Scofield *	May 24, 1943	12,500	30 **	-	-

\* Projects include no Federally-owned land.

\*\* Projects closed, no further development work contemplated.

1/ In addition there are privately-owned lands within a number of projects on which development work is done.

2/ Estimated number of units to be developed.

(c) Land Utilization Projects

This item provides for the reconstruction of the spillway on Greenleaf Lake in the Cookson Hills Land Utilization Project in Oklahoma. The 1952 Appropriation Act contained a provision which continued, until expended, not to exceed \$265,000 of the funds appropriated for fiscal year 1951 for the development of land utilization projects. An agreement has been entered into with the Corps of Engineers, Department of the Army, to include this work as a part of its larger program of development of Greenleaf Lake, and the funds have been made available to that Department by advance working fund.



(d) Payments Due Counties, Submarginal Land Program,  
Farm Tenant Act (Permanent Appropriation)

This item covers obligations for the payment to counties of 25 percent of the net revenues received each calendar year from the use of lands administered by the Secretary, under the provisions of Title III of the Bankhead-Jones Farm Tenant Act, approved July 22, 1937, as follows:

Item	: Actual,	: Estimated,	: Estimated,
	: 1951	: 1952	: 1953
Payments due counties .....	: \$271,758:	\$298,000:	\$344,000
	:	:	:

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS  
AND OTHER FUNDS

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Flood Control, Agriculture</u>			
(Soil Conservation Service):			
For preliminary examinations:			
and surveys .....	\$995,312	\$1,084,216	\$545,000
For works of improvement ..	5,653,379	4,316,141	4,695,280
For general basin investi-			
gations in the Arkansas-			
White-Red River, Colorado			
River and New York-			
New England areas .....	- -	75,500	132,500
Total, Flood Control ....	6,648,691	5,475,857	5,372,780
<u>Construction, Water Conservation:</u>			
<u>and Utility Projects, (Agri-</u>			
<u>culture, Soil Conservation</u>			
<u>Service):</u>			
For land development on			
water conservation and			
utility projects .....	75,701	19,596	- -
<u>Conservation and Use of Agri-</u>			
<u>cultural Land Resources, Pro-</u>			
<u>duction and Marketing Admin-</u>			
<u>istration, (Soil Conservation</u>			
<u>Service):</u>			
For technical assistance in			
the flood disaster areas .	- -	615,000	- -
<u>Working Fund, Agriculture, Soil</u>			
<u>Conservation Service,</u>			
<u>Advanced from:</u>			
<u>Department of Interior:</u>			
Bureau of Reclamation, for			
the establishment and			
measurement of additional			
snow courses .....	19,316	19,465	- -
Bonneville Power Administra-			
tion, for expansion of the			
snow survey program in the			
Columbia River Basin .....		1,615	- -
Total, Department of the			
Interior .....	19,316	21,080	- -

(Continued on next page)

Item	Obligations, 1951	obligations, 1952	obligations, 1953
<u>Department of Defense,</u>			
<u>Department of the Army:</u>			
Corps of Engineers, for			
conducting a snow survey			
program in the Boise			
River Basin .....	4,560	4,300	
Corps of Engineers, for			
the production and de-			
livery of grass seed for			
the McNary Dam Project ..	4,438	44,985	- -
Corps of Engineers, for			
the production of pine			
seedlings .....	316		
Total, Department of			
Defense, Department of			
the Army .....	9,314	49,285	- -
Total, Working Fund,			
Agriculture, Soil Con-			
servation Service .....	28,630	70,365	- -
<u>Working Fund, Agriculture,</u>			
<u>General (Soil Conservation</u>			
<u>Service) Advanced from:</u>			
<u>Department of Interior:</u>			
Bureau of Reclamation, for			
studies in connection with			
the development of an			
evaluation of the agri-			
cultural repayment			
feasibility of the Weber			
Basin Reclamation Project,			
Utah .....	3,232	368	- -
<u>Department of Defense, De-</u>			
<u>partment of the Army:</u>			
Corps of Engineers, for			
providing data in connec-			
tion with a comprehensive			
survey of the Arkansas,			
White and Red River			
Basins .....	35,176		
Corps of Engineers, for			
preparation of strategic			
maps and map material .....	11,278	983	- -
Total, Department of			
Defense, Department of			
the Army .....	46,454	983	- -

(Continued on next page)



Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
Department of Defense, Department of the Air Force:			
For execution of mosaic compilation and miscellaneous photographic reproductions .....	28,347	265,500	- -
Total, Working Fund, Agriculture, General .....	78,033	266,851	- -
Working Fund, Agriculture, Soil Conservation Service (Special Account) Advanced from:			
Department of Interior:			
Bureau of Reclamation, for the establishment and measurement of additional snow courses .....	962	- -	- -
Operation and Maintenance, Water Distribution Systems, Water Conservation and Utilization Projects (Trust Fund):			
For receipts for operation and maintenance expenses of the Wyoming Rural Rehabilitation Corporation's water distribution system in the Eden Vally, Wyoming water conservation and utilization project (40 U.S.C. 431-434) .....	9,580	11,200	10,900
Payments in Lieu of Taxes, and Operation and Maintenance Costs, Water Conservation and Utilization Projects (Trust Fund):			
For receipts from land leases for payments in lieu of taxes to States, political subdivisions thereof, and local taxing units, and for operation and maintenance expenses of the resettlement features of certain water conservation and utilization projects (40 U.S.C. 431-434) .....	42,326	77,400	41,200

(Continued on next page)

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
<u>Technical Services and Other Assist-</u>			
<u>ance, Agricultural Conservation</u>			
<u>Program, Soil Conservation Service</u>			
<u>(Trust Fund):</u>			
For providing technical and other			
assistance to farmers and ranchers:			
in participating counties pursuant:			
to agreements with individual			
Production and Marketing Adminis-			
tration State and County			
committees .....	172,579	216,367	200,000
<u>Miscellaneous Contributed Funds,</u>			
<u>Department of Agriculture (Soil</u>			
<u>Conservation Service) Trust Funds</u>			
<u>deposited by cooperating agencies,</u>			
<u>as follows:</u>			
1. For flood control works of im-			
provement on the Los Angeles			
watershed .....	193,416	130,220	104,700
2. For flood control works of			
improvement on the Little			
Tallahatchie watershed .....	2,650	- -	- -
3. For soil and water conservation			
work in the Antelope Valley Soil			
Conservation District of			
California .....	600	600	600
4. For making land capability sur-			
veys and preparing land capability			
maps of McCracken County,			
Kentucky .....	3,509	4,491	- -
5. For cooperation with the central:			
and Southern Florida Flood Control:			
District on water control in the			
Everglades area .....	5,375	10,225	10,000
6. For cooperation with the San			
Antonio River Canal and Conser-			
vancy District on a survey of the			
San Antonio river watershed .....	- -	75,000	75,000
7. For carrying out a program of			
investigations and research			
covering eradication or control			
of noxious brush and trees in			
cooperation with the Flying			
Farmers Foundation, Inc. ....	- -	1,250	1,250

(Continued on next page)

Item	Obligations, 1951	Estimated obligations, 1952	Estimated obligations, 1953
8. For flood control works of improvement on the Yazoo watershed .....	- -	10,000	- -
9. For cooperative snow surveys and water supply forecasts in the Weber River Basin .....	- -	1,800	1,800
Total, Miscellaneous Contributed Funds, Department of Agriculture .....	205,550	233,586	193,350
<u>Mutual Security (Allotment to Agriculture) (Soil Conservation Service):</u>			
For administrative expenses in connection with comprehensive training of foreign technicians in the principles and practices of soil and water conservation and proper land use .....	11,225	15,379	- -
<u>Obligations under reimbursements from Governmental and other agencies:</u>			
Salaries and expenses;			
Sale of cartographic reproductions, cooperative projects with State agencies, sale of nursery stock and detail of personnel to other Federal agencies, etc. ....	349,573	312,000	312,000
Water conservation and utilization projects .....	2,670	7,172	4,200
Flood Control .....	35,392	9,600	17,600
Total .....	387,635	328,772	333,800
<u>TOTAL OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS .....</u>	<u>7,660,912</u>	<u>7,330,373</u>	<u>6,152,030</u>





## PASSENGER MOTOR VEHICLES

The estimates for 1953 propose the replacement of 146 passenger motor vehicles at a net cost of \$157,900 after considering exchange allowances. With the possible exception of vehicles which may need to be replaced because of destruction by fire or accident, each of the vehicles to be replaced will average approximately ten years of age and will have been driven an average of about 96,000 miles at time of disposal.

The Service authorizes the use of passenger motor vehicles for district conservationists, technical specialists, survey supervisors, research project and nursery technicians and State and Regional Office personnel in areas where public transportation is inadequate or nonexistent, or for types of travel where considerable distances are involved and use of a pickup truck is not feasible. The transportation of "resident" technical personnel to adjacent work areas is generally by means of pickup trucks. Since 1943 the Service has reduced the number of its passenger cars by 231 vehicles (13.9 percent). By June 30, 1953 it is anticipated that the total number will be further reduced by 54 vehicles, or four percent below the number in operation June 30, 1951.







